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# American Veterinary Medical Association

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## CONTENTS

Editorial ..... 791
Applications for Membership ..... 795
Coming Veterinary Meetings ..... 798
Papers:
Researches on Bacillus-Calmette-Guerin and Experimental Vaccination Against Bovine Tuberculosis—E. A. Watson, C. W. McIntosh and H. Konst 799
The Federal Food and Drugs Act and the Insecticide Act: Their Importance to the Veterinary Profession, and Personal Experiences in Their Enforcement—B. T. Woodward ..... 817
A Medium for the Isolation of Salmonella Pullorum and Other Members of the Paratyphoid Group from Avian Tissues—W. L. Mallmann, Frank Thorp, Jr., and Margaret Semmes ..... 825
The Accuracy of the Agglutination Test in the Diagnosis of Bacillary White Diarrhea—Philip R. Edwards and Floyd E. Hull ..... 839
Comparison of Tube and Slide Agglutination Tests for Bacillary White Diarrhea—L. D. Bushnell and C. A. Brandly ..... 844
Studies on a Gross No-Lesion Tuberculin Reactor—H. E. Biester and Chas. Murray ..... 848
Gastro-Intestinal Parasites of Equines and Control Measures—Benjamin Schwartz ..... 855
Clinical and Case Reports:
Use of Kamala in Tapeworm Infestations of Sheep—T. O. Brandenberg ..... 871
The Occurrence of the Swine Kidney Worm (Stephanurus Dentatus) in the Urinary Bladder and Ureters of the Host Animal—E. M. Nighbert ..... 874
Cottonseed-Meal Poisoning?—N. S. Mayo ..... 875
Army Veterinary Service ..... 876
Communications ..... 877
Association News:
Proceedings of the Sixty-fifth Annual Meeting of the American Veterinary Medical Association—Reports of Section Meetings ..... 879
Alumni Meetings at Minneapolis ..... 887
Organization of the Veterinary Medical Association, 1928-1929 ..... 896
Other Meetings ..... 901
Necrology ..... 910
Personals ..... 913
Index ..... i-viii

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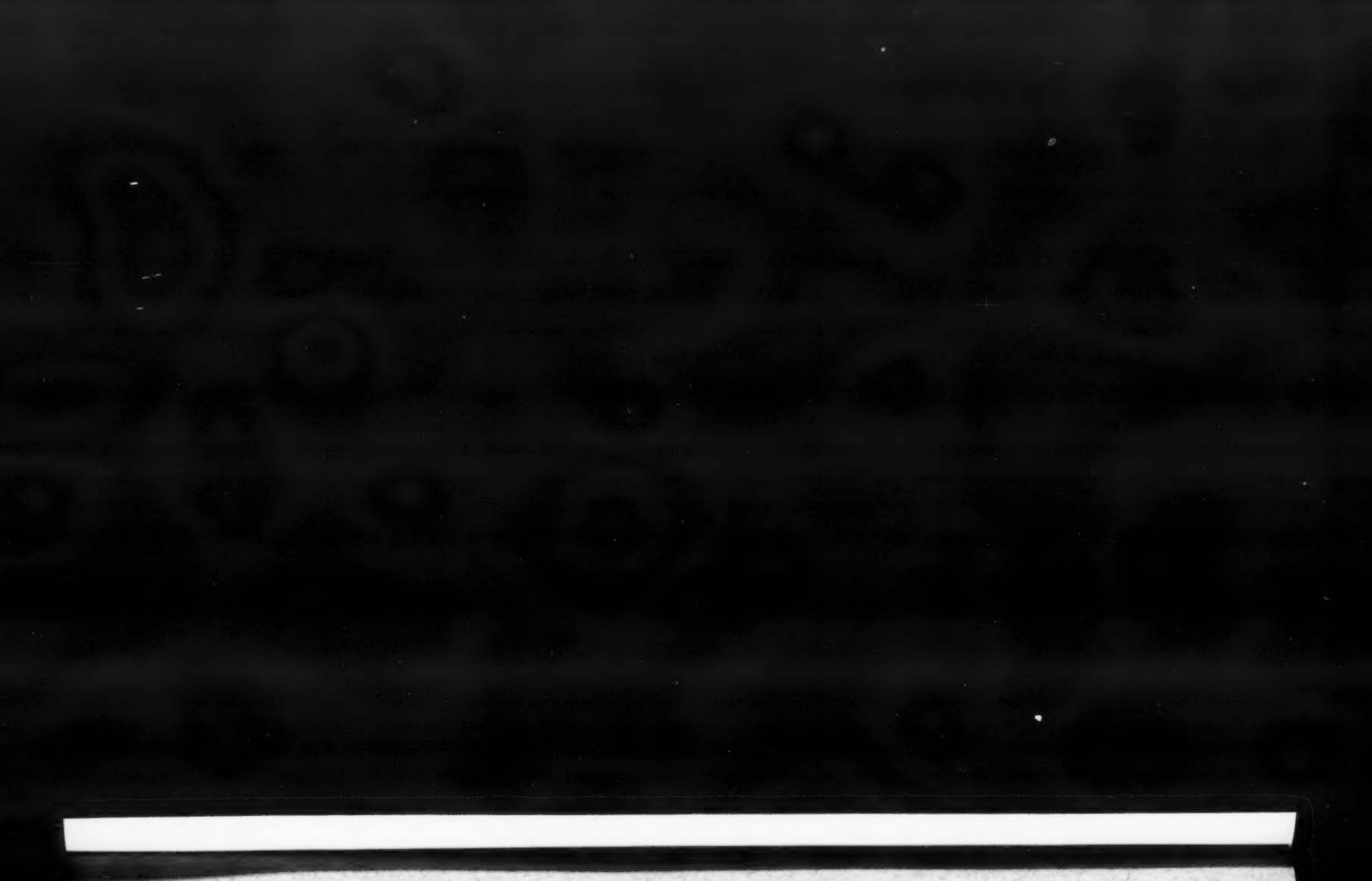

# JOURNAL

OF THE

## American Veterinary Medical Association

FORMERLY AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n.)

H. Preston Hoskins, Secretary-Editor, 716 Book Building, Detroit: Mich.



T. E. Munce, President, Harrisburg, Pa. M. Jacob, Treasurer, Knoxville, Tenn.

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## STUDENT ENROLLMENT FOR 1928-1929

Reports received from the twelve recognized veterinary colleges in the United States and Canada reveal another healthy increase in student enrollment for the new college year. Figures supplied by the respective deans and compiled in this office show an increase of 158 students over last year. The grand total indicates that there are 917 students pursuing veterinary studies in the twelve colleges, as compared with 759 one year ago. Every one of the twelve colleges shows an increase in enrollment over last year. Some of these increases are rather small, while others are comparatively large. It will be noted that there is one less college this year than last, the University of Montreal having ceased to maintain a school of veterinary medicine.

The enrollment of 324 new students this year is very encouraging, being 79 more than one year ago. The number of sophomore students this year is 227, as compared with 189 last year. We find 185 juniors this year against 150 for the previous year. Senior students total 152, as against 143 last year. Our records show that, of the 143 seniors reported a year ago, 138 finished their courses and were graduated, rather a high percentage. One thing is quite evident, however, and that is that we can not expect a very great increase in the number of graduates in 1929 over 1928, in view of the fact that the present senior classes contain only 152 men all told.

There is a slight decrease in the number of graduate veterinary students this year, the number having dropped from 25 to 22. The number of special students remains the same. In this classification, we have placed all those students who are not definitely classified as belonging to any one of the four underclasses.

As far as the number of graduates is concerned, the year 1928 marks the turning point. Since 1918 there has been a gradual falling off in the number of new veterinarians added to our ranks through graduation each year. The number got to the low point in 1927, when 117 entered the profession through graduation, compared with 867 in 1918. Of course, it is impossible for anyone to state authoritatively just how many new veterinarians

*Veterinary student enrollment for the college year 1928-1929*

| | Fr. | Soph. | Jun. | Sen. | Spec. | Grad. | Total | 1927–28 | Change |
|---|---|---|---|---|---|---|---|---|---|
| Alabama P. I.... | 9 | 2 | 11 | 4 | 0 | 0 | 26 | 16 | +10 |
| Colorado A. C.. | 31 | 21 | 15 | 5 | 0 | 0 | 72 | 55 | +17 |
| Cornell Univ.... | 47 | 36 | 23 | 28 | 0 | 4 | 138 | 112 | +26 |
| Georgia S. C.... | 20 | 9 | 3 | 2 | 0 | 0 | 34 | 16 | +18 |
| Iowa State Col.. | 55 | 37 | 30 | 20 | 0 | 6 | 148 | 113 | +35 |
| Kansas S. A. C.. | 30 | 17 | 16 | 16 | 2 | 2 | 83 | 74 | + 9 |
| Michigan S. C... | 5 | 4 | 8 | 12 | 0 | 6 | 35 | 34 | + 1 |
| Montreal Univ.. | C | L | O | S | E | D | | 17 | —17 |
| Ohio State U.... | 34 | 37 | 22 | 15 | 0 | 0 | 108 | 95 | +13 |
| Ontario V. C.... | 24 | 19 | 18 | 18 | 2 | 0 | 81 | 78 | + 3 |
| Penna. Univ. of. | 34 | 21 | 18 | 9 | 3 | 3 | 88 | 72 | +16 |
| Texas A. M. C. | 7 | 5 | 2 | 3 | 0 | 1 | 18 | 9 | + 9 |
| Washington S. C. | 28 | 19 | 19 | 20 | 0 | 0 | 86 | 68 | +18 |
| Totals..... | 324 | 227 | 185 | 152 | 7 | 22 | 917 | 759 | +158 |

each year will be required to fill up the vacancies and new openings in the profession, but everybody seems to be pretty well agreed that the number of veterinary students, who have been pursuing their courses in our veterinary colleges during recent years, is entirely too low to meet the normal requirements. It will take a number of years to catch up with the losses of recent years and there need be no fears upon the part of these students now enrolled that there will not be good openings for them just as soon as they complete their courses.

During the past few months, we have had an unusually large number of inquiries from veterinarians looking for assistants. The supply of men available for these positions has been considerably short of the demand. Announcement is made, on another page of this issue of the Journal, of the third civil-service exam-

ination to be held during the present calendar year to fill vacancies in the Bureau of Animal Industry. Three examinations were held for the same purpose during the year 1927. A few years ago, it was customary to hold about one examination each year. With new openings for veterinarians constantly being created and a general improvement in practice in nearly all parts of the country, we believe that the outlook for the profession was never brighter than at the present time.

## MEMBERSHIP DIRECTORY

The new edition of the A. V. M. A. Membership Directory will be ready for distribution some time during the present month. It will present one feature which will be radically different from all previous editions of the Directory. Instead of the names of our members being listed in alphabetical order, regardless of their geographical location, the names will appear grouped by states, provinces, etc. Experience of the past five years has shown that there are just as many requests for state lists as there are for complete alphabetical lists.

As in previous editions of the Directory, there will be a complete list of the organization of the A. V. M. A. for the year 1928-1929, containing the names of all officers, the personnel of all standing and special committees and a complete list of our resident state, provincial, territorial and foreign corresponding secretaries. This list is being published almost concurrently in this number of the JOURNAL. President Munce is to be complimented upon the promptness with which he has made his appointments for the year. This is no small task and involves the writing of hundreds of letters by the President and Secretary.

The Directory will also contain the Constitution and By-Laws of the A. V. M. A. right up to date, with the various changes which were approved at the recent meeting in Minneapolis. Other features of the Directory include a complete list of the presidents, secretaries and treasurers from the beginning of the Association right down to date, as well as a complete list of all meetings that have been held, with dates and places. A copy of the Directory will be mailed to every member of the A. V. M. A. Extra copies will be placed on sale at the price of $2.00 per copy. Each member should carefully preserve his own copy, as we will not be able to replace lost copies without making a charge for the same. The names of all members whose applications were completed up

to November 1, 1928, appear in the list of active members. Prospective members who have applications pending are listed in a separate section, as well as a list of the student chapters of the A. V. M. A. located in the various veterinary colleges in the United States and Canada.

## EXECUTIVE BOARD CHANGES

Following his election to the presidency of the A. V. M. A., at the Minneapolis meeting, Dr. T. E. Munce resigned as a member of the Executive Board, representing District No. 2. Exercising the executive prerogatives prescribed in Section 9, of Article V, of the Constitution, Dr. Munce has filled the vacancy by appointing Dr. E. P. Althouse, of Sunbury, Pa., as his successor. Dr. Althouse will hold office until a special election can be held in District No. 2, for the purpose of filling the vacancy. Dr. Munce was re-elected a member of the Executive Board for District No. 2 this year and his term of office would not have expired until the close of the annual convention to be held in 1933. Therefore, the member who is elected to fill the vacancy will serve for the term which will expire in 1933. All members of the A. V. M. A. in good standing, located in District No. 2, will have the privilege of participating in the election of a member to represent them on the Executive Board. The special election will be held by mail ballot and the rules for regular elections will prevail.

DR. E. P. ALTHOUSE

Dr. Althouse has been a member of the A. V. M. A. for twentyfive years, having joined the year of his graduation from the University of Pennsylvania in 1903. He has served as secretary of the Section on General Practice since 1926, having been elected at the Lexington meeting.

Dr. C. H. Stange, who represents District No. 5 on the Executive Board, was elected chairman of the Board at the final session of the Board held in Minneapolis.

DR. C. H. STANGE
Chairman of the Executive Board

## APPLICATIONS FOR MEMBERSHIP

(See May, 1928, JOURNAL)

FIRST LISTING

AUSTIN, EDWIN MUNROE 451 Ulysses St., Los Angeles, Calif.
D. V. M., Iowa State College, 1918
Vouchers: W. L. Curtis and Kenneth G. McKay.

BEARD, THOMAS GEORGE 3684 Beverly Blvd., Los Angeles, Calif.
D. V. M., Colorado Agricultural College, 1927
Vouchers: W. L. Curtis and Kenneth G. McKay.

BELL, RALPH M. 2116 E. Colorado St., Pasadena, Calif.
D. V. M., Cornell University, 1909
Vouchers: W. L. Curtis and John L. Tyler.

BERGMAN, ROY EDWIN Cassopolis, Mich.
D. V. M., Michigan State College, 1921
Vouchers: Edw. K. Sales and Ward Giltner.

BIRCH, ALFRED L., 203 Administration Bldg., Union Stock Yds., Los Angeles, Calif.
D. V. M., Iowa State College, 1921
Vouchers: W. L. Curtis and Kenneth G. McKay.

BOWERS, JOSEPH M., 4411 Lucerne St., Bellevue, R.F.D. No. 7, Pittsburgh, Pa.
D. V. M., Colorado Agricultural College, 1925
Vouchers: L. D. Barrett and Samuel E. Young.

BRUNSON, ROBERT A. Corona, Calif.
D. V. M., Kansas State Agricultural College, 1928
Vouchers: W. L. Curtis and John L. Tyler.

BRYANS, JOSEPH W. 560 7th St., San Diego, Calif.
V. S., Ontario Veterinary College, 1907
Vouchers: W. L. Curtis and Kenneth G. McKay.

CLARK, HOLLIS HAMMOND — Perry, Mich.
D. V. M., Michigan State College, 1927
Vouchers: Ward Giltner and B. J. Killham.

CLEVELAND, W. J. — 986 E. Center St., Bellflower, Calif.
D. V. M., Iowa State College, 1910
Vouchers: W. L. Curtis and Kenneth G. McKay.

COAD, JOSEPH A. — 609 Minaflores St., San Pedro, Calif.
B. V. S., Ontario Veterinary College, 1923
Vouchers: W. L. Curtis and Kenneth G. McKay.

COULTER, TRACY J. — 1771 N. Highland Ave., Los Angeles, Calif.
B. V. S., Ontario Veterinary College, 1921
Vouchers: W. L. Curtis and Kenneth G. McKay.

DAVIDSON, F. N. — 1837 N. Euclid, Ontario, Calif.
M. D. C., Chicago Veterinary College, 1907
Vouchers: W. L. Curtis and John L. Tyler.

FAUSSET, J. K. — Spiceland, Ind.
D. V. M., Indiana Veterinary College, 1917
Vouchers: Frank H. Brown and C. T. Howard.

FERGUSON, A. T. — 5866 S. Main St., Los Angeles, Calif.
D. V. M., Cornell University, 1908
Vouchers: W. L. Curtis and Kenneth G. McKay.

GLENN, SAMUEL — 117 S. Negley Ave. E. E., Pittsburgh, Pa.
D. V. M., Cornell University, 1921
Vouchers: V. A. Moore and S. E. Young.

GREENING, W. L. — 909 W. Anaheim St., Long Beach, Calif.
D. V. M., McKillip Veterinary College, 1913
Vouchers: W. L. Curtis and Kenneth G. McKay.

HAPENNEY, JAMES E. — 5258 W. Pico St., Los Angeles, Calif.
D. V. M., Chicago Veterinary College, 1918
Vouchers: W. L. Curtis and Kenneth G. McKay.

HICKEY, DANIEL J. — 618 Roosevelt Ave., Salt Lake City, Utah.
D. V. S., U. S. College of Veterinary Surgeons, 1910
Vouchers: F. E. Murray and E. P. Durham.

HULL, FREDERICK T. — 1004 N. Fresno St., Fresno, Calif.
M. D. V., McKillip Veterinary College, 1909
Vouchers: Stephen O'Toole and A. C. Rosenberger.

IMMENSCHUH, ALDIE PHILIP — Santee, Calif.
D. V. S., Kansas State Agricultural College, 1914
Vouchers: W. L. Curtis and Kenneth G. McKay.

JAMESON, EDWARD F. — 3005 Lothrop St., Detroit, Mich.
D. V. M., Kansas City Veterinary College, 1906
Vouchers: Melvin A. Ruck and Ashley G. Stamp.

KNIGHTON, L. K. — 3438 Mt. View Drive, San Diego, Calif.
D. V. M., Ohio State University, 1911
Vouchers: W. L. Curtis and Kenneth G. McKay.

KOHN, WILLIAM BERNARD — 6526 North 17th St., Philadelphia Pa.
V. M. D., University of Pennsylvania, 1918
Vouchers: Fred Boerner and Malcolm J. Harkins.

MATHEW, FLOYD A. — 2816 E. Anaheim St., Long Beach, Calif.
D. V. M., Ohio State University, 1925
Vouchers: W. L. Curtis and Kenneth G. McKay.

MEYER, DONALD BLAIRE — East Lansing, Mich.
D. V. M., Michigan State College, 1927
Vouchers: E. T. Hallman and B. J. Killham.

MILLER, G. N. — 228 E. Corina Blvd., Covina, Calif.
D. V. M., San Francisco Veterinary College, 1915
Vouchers: W. L. Curtis and John L. Tyler.

NEER, LESTER COOK 324 Edgar Ave., Dayton, Ohio.
D. V. M., Ohio State University, 1919
Vouchers: David S. White and Jas. D. Grossman.

O'HARRA, GUY L. General Delivery, Modesto, Calif.
D. V. M., Kansas City Veterinary College, 1918
Vouchers: Harry E. Van Tuyl and W. L. Curtis.

PULLIN, J. H. 1806 N. Broadway, Santa Ana, Calif.
D. V. S., San Francisco Veterinary College, 1910
Vouchers: W. L. Curtis and Kenneth G. McKay.

RAWLINGS, WARREN B. Swiftwater, Pa.
V. M. D., University of Pennsylvania, 1928
Vouchers: E. T. Booth and G. A. Dick.

RING, WILLIAM CHARLES Auckland, New Zealand.
V. M. D., University of Pennsylvania, 1911
Vouchers: M. F. Barnes and T. E. Munce.

ROCKEY, WILLIAM H. 121 East E., Ontario, Calif.
M. D. C., Chicago Veterinary College, 1909
Vouchers: W. L. Curtis and John L. Tyler.

SPARKS, ERNEST R. 764 W. First St., Pomona, Calif.
D. V. S., Kansas City Veterinary College, 1909
Vouchers: W. L. Curtis and John L. Tyler.

SPRINGER, GEO. E. Ashtabula, Ohio.
D. V. M., Ohio State University, 1915
Vouchers: Davis S. White and Jas. D. Grossman.

SPRINGER, RALPH R. Rt. Box 357B, Indianapolis, Ind.
D. V. M., Indiana College, 1916
Vouchers: C. A. Clawson and Benj. H. Yenner.

TOBIN, HERMAN ALBERT Three Rivers, Mich.
D. V. M., McKillip Veterinary College, 1909
Vouchers: Edw. K. Sales and W. N. Armstrong.

WEST, T. E. 4234 Euclid Ave., San Diego, Calif.
D. V. M., Chicago Veterinary College, 1914
Vouchers: W. L. Curtis and Kenneth G. McKay.

WINTER, L. A. Eau Claire, Mich.
D. V. M., Indiana Veterinary College, 1911
Vouchers: E. L. Krieger and F. O. Bray.

YOUNG, OLIVER K. 947 Clinton St., Noblesville, Ind.
D. V. M., Indiana Veterinary College, 1917
Vouchers: R. A. Miller and Frank H. Brown.

## Applications Pending

SECOND LISTING

Carroll, Floyd Eugene, Box 251, Faculty Exchange, Texas A. & M. College, College Station, Texas.
Conrad, H. P., R. R. 3, Port Huron, Mich.
Gwaltney, John S., 14 Willow St., Potsdam, N. Y.
Heacock, C. C., Rapid City, S. Dak.
Isham, Russell R., 124 Auburn Ave., Auburn, Wash.
Kelly, Patrick J., 8626 12th St., Detroit, Mich.
LaRue, Irving G., Dept. of Agriculture, Sacramento, Calif.
Thomas, Owen Ellis, Willard, Ohio.
Thoreson, M., Mayville, N. Dak.
Turla, Faustino F., 169 Nagtahan, Manila, P. I.

The amount which shall accompany an application filed this month is $5.83, which covers membership fee and dues to January 1, 1929, including subscription to the JOURNAL. It is suggested that applications filed this month be accompanied by remittance for $10.83, the additional $5.00 being for the 1929 dues.

## COMING VETERINARY MEETINGS

Connecticut Veterinary Medical Association. Danbury, Conn., November 7, 1928. Dr. E. H. Patchen, Secretary, Milford, Conn.

San Diego-Imperial Valley Medical Association. San Diego, Calif. November 7, 1928. Dr. W. G. Oliver, Secretary, 3821 Arizona St., San Diego, Calif.

New York City, Veterinary Medical Association of. Academy of Medicine. Fifth Avenue and 103rd St., New York, N. Y. Dr. C. P. Zepp. Secretary, 128 W. 53rd St., New York, N. Y.

Chicago Veterinary Society. Great Northern Hotel, Chicago, Ill. November 13, 1928. Dr. J. B. Jaffray, Secretary, 2956 Washington Blvd., Chicago, Ill.

Southeastern Michigan Veterinary Medical Association. Detroit, Mich. November 14, 1928. Dr. H. Preston Hoskins, Secretary, 716 Book Bldg., Detroit, Mich.

Hudson Valley Veterinary Medical Society. Poughkeepsie, N. Y. November 14, 1928. Dr. J. G. Wills, Secretary, 122 State St., Albany, N. Y.

Missouri Valley Veterinary Association. Kansas City, Mo. November 20-22, 1928. Dr. E. R. Steel, Secretary, 8023 Wornall Rd., Kansas City, Mo.

Kansas City Association of Veterinarians. New Baltimore Hotel, Kansas City, Mo. November 20, 1928. Dr. J. D. Ray, Secretary, 400 New Centre Bldg., Kansas City, Mo.

Southern California Veterinary Medical Association. Chamber of Commerce Bldg., Los Angeles, Calif. November 21, 1928. Dr. W. L. Curtis, Secretary, 1264 W. 2nd St., Los Angeles, Calif.

Illinois State Veterinary Medical Association. Chicago, Ill. December 3-4, 1928. Dr. W. H. Welch, Secretary, Lexington, Ill.

National Association of B. A. I. Veterinarians. La Salle Hotel, Chicago, Ill. December 5-7, 1928. Dr. J. S. Grove, Secretary, 1715 Belmont Ave., Fort Worth, Texas.

United States Live Stock Sanitary Association. La Salle Hotel, Chicago, Ill. December 5-7, 1928. Dr. O. E. Dyson, Secretary, 45 Live Stock Exchange Bldg., Wichita, Kans.

Nebraska State Veterinary Medical Association. Omaha, Nebr. December 11-12, 1928. Dr. George A. Young, Secretary, Syracuse, Nebr.

# RESEARCHES ON BACILLUS-CALMETTE-GUERIN AND EXPERIMENTAL VACCINATION AGAINST BOVINE TUBERCULOSIS*

*By* E. A. WATSON

*In collaboration with* C. W. MCINTOSH *and* H. KONST
*Dominion of Canada, Department of Agriculture, Research Laboratories, Hull, Quebec*

In 1924, Professors Calmette and Guérin, of the Institute Pasteur, France, announced a new method for the prophylactic immunization of cattle against tuberculosis. This method, briefly, is the administration to the new born of a living culture of tubercle bacilli, which it is claimed has been completely deprived of virulence through a long series of artificial cultivations upon a particular medium. "Vaccination by our bacillus B. C. G.," so it is stated, "is inoffensive, not only for young bovines and for adult cattle free from tuberculosis, but also for all species of animals susceptible to infection by the tubercle bacillus. This bacillus is completely deprived of virulence. It has lost all aptitude of provoking the formation of tubercles . . . "

The authors' reputation, their frankness and their clear exposure of their hypotheses and of the protocols of their experiments justified an immediate investigation and research.

The claims made were obviously of great practical importance and, if they could be substantiated and confirmed, anti-tuberculosis vaccination, according to the method of Calmette and Guérin would, doubtless, be introduced and generally applied as one of the chief means of safeguarding cattle against the disease.

The question, reduced to its simplest form, is: Is it safe; is it efficient? But this question carries with it a great many contributory questions and it requires a vast amount of experimental research before it can be definitely answered. As to safety, we mean: Is it harmless, truly non-pathogenic and entirely without danger to the animal treated with it? Are the animals receiving B. C. G. vaccine, both before and after subsequent exposure to natural infection, harmless and without danger to those with which they come in contact, directly or indirectly?

*Presented at the sixty-fifth annual meeting of the American Veterinary Medical Association, Minneapolis, Minn., August 7-10, 1928.

Is the claimed innocuity of B. C. G. a fixed character or just a lowered degree of virulence which may again ascend under either natural conditions or in the course of artificial cultivation? What is the ultimate fate of the vaccinating bacilli and what further modification may take place, especially with regard to restoration of virulence, after a long sojourn in the animal body or after passage from animal to animal?

As to efficiency, does it increase resistance and, if so, to what extent or degree? Does it actually prevent subsequent infection with virulent tubercle bacilli, or does it enable an animal to tolerate such an infection without any harmful result? Does it actually prevent tuberculosis?

Such is the problem, according to our conception of it, upon which we have continued to work since 1924.

## I. Bacillus-Calmette-Guerin and the Question of Virulence

It is said that: (a) the origin of Bacillus-Calmette-Guérin is a very virulent strain of the bovine type; (b) after successive cultivations upon a glycerinated bile medium commencing January 8, 1908, and transplanting about every fifteen days, the bacillus after four years was no longer virulent for cattle but still retained its virulence for the horse; and (c) after thirteen years of successive cultures upon bile-potato medium it had become attenuated to the extent that it had completely lost its virulence for all species of animals but, nevertheless, retained its tuberculin-producing properties and its power of sensitizing animals to react to the ordinary tuberculin tests.

Two sample B. C. G. cultures were very kindly given to us by Professors Calmette and Guérin for research purposes. One, hereinafter referred to as "B. C. G. (80)," was forwarded direct to Ottawa from the Institute Pasteur, Lille; the other, "B. C. G. (17)," was personally handed to me by Professor Calmette at the Institute Pasteur, Paris. These two original cultures we have carried through successive generations, always keeping them distinct and separate and, from time to time, have made upon guinea pigs pathogenicity experiments with vaccine suspensions prepared for the prophylactic treatment of new-born calves.

### B. C. G. Pathogenicity Experiments

*Experiment 1, January 20, 1925:*

Sixteen guinea pigs were inoculated with B. C. G. (80), suspension A; four pairs subcutaneously and four pairs intra-

peritoneally, the dose of bacilli being 0.5, 1.0, 2.0, and 5.0 mgs., moist weight, for each pair. Two rabbits also were inoculated, intravenously, one with 1.0 mg. and the other with 5.0 mgs. of bacilli. The results in some cases were interfered with by deaths attributed to pneumonia. The first death occurred on the sixth day after inoculation and the last on the 542nd day—the end of the period of observation.

Nine of the sixteen inoculated guinea pigs, in the course of five to eighteen months, developed generalized tuberculosis, which apparently was the cause of death in six of them, and would probably have caused death in the three others had they not been destroyed.

Seven guinea pigs died from causes other than tuberculosis and in six of these there was no discernible tuberculous lesion.

The two rabbits died on the 114th and 115th days, from unknown causes, one showing slight tuberculous lesions in the lung, the other no trace of a tuberculous lesion.

It is of interest to note that the two guinea pigs which survived the longest, approximately eighteen months, died, one from tuberculosis, and the other from an unknown cause, but free from visible tuberculosis.

*Experiments 2, 3 and 4, March 11, May 13, and July 15, 1925:*

Eight guinea pigs were inoculated subcutaneously and one rabbit intravenously, each receiving 1.0 mg. of B. C. G. (80), moist weight (suspensions B, C and D). All died from enzootic pneumonia between the 12th and 123rd days after inoculation. Only one guinea pig showed slight tuberculous lesions of the spleen and mesenteric lymph-glands, the remainder, as well as the rabbit, died without visible tuberculous lesion.

*Experiment 5, December 24, 1925:*

Twenty-eight guinea pigs were inoculated with doses of B. C. G. (80) varying between 0.5 and 5.0 mgs., moist weight (suspension E). Three rabbits received intravenously 1.0, 2.0, and 5.0 mgs., respectively. The total duration of the experiment was 447 days. The first death occurred on the 78th day, from pneumonia, and this guinea pig showed slight tuberculous lesions of the liver and of the mesenteric, sublumbar and axillary lymph-glands, with acid-fast bacilli present. Three more guinea pigs died from causes other than tuberculosis, on the 186th, 231st and 338th days after inoculation without visible tuberculous lesion.

The remaining twenty-four animals were killed, three after an observation period of five to six months and twenty-one after a period of twelve to fourteen months. In three guinea pigs apparently tuberculous lesions of very slight extent were visible in the liver and spleen. The others, and the rabbits, were entirely negative.

None of the animals in this experiment died from tuberculosis and in only four were very slight tuberculous lesions found, apparently non-progressive, possibly retrogressive.

*Experiment 6, June 28, 1926:*

Two guinea pigs were inoculated with 2.0-mg. doses of B. C. G. (80), moist weight (suspension G), one subcutaneously and the other intraperitoneally.

Both animals died from causes other than tuberculosis at the end of three months and were free from visible tuberculous lesions.

*Experiments 7 and 8, August 27, 1926:*

Twenty guinea pigs were inoculated with 2.0-mg. doses of B. C. G. (80), suspensions H and I, ten subcutaneously and ten intraperitoneally. The period of observation was one year.

Of those inoculated subcutaneously, two died from causes other than tuberculosis during the ninth month of observation and the eight remaining were destroyed after a period of one year. A tuberculous lesion was found in the cervical gland of one of these guinea pigs and in the axillary and inguinal lymph-glands of another guinea pig. In the remainder no tuberculous lesion could be found.

Of those inoculated intraperitoneally, one died on the 37th day with tuberculous lesions in the liver, spleen, mesenteric and inguinal lymph-glands and three died during the ninth month of observation. The remainder were destroyed after one year. Every animal in this group showed meseteric tuberculous lesions, in some of which acid-fast bacilli could be demonstrated. No other lesions were found except in one animal destroyed on the 372nd day, in which the lungs and bronchial glands were found tuberculous.

*Experiment 9, August 27, 1926:*

Twenty guinea pigs were inoculated with 2.0-mg. doses of B. C. G. (80), suspension J, ten subcutaneously and ten intraperitoneally. The period of observation was extended in some cases to eighteen months.

Of those inoculated subcutaneously, one guinea pig, dead on the 49th day from an unknown cause, showed suspicious tuberculous lesions in the liver and spleen. The remainder showed no visible tuberculous lesion.

Of those inoculated intraperitoneally, eight showed tuberculous lesions of the mesenteric lymph-glands and one of these, dead on the 354th day, showed additional lesions of the spleen and bronchial lymph-glands, with acid-fast bacilli present.

Two guinea pigs, destroyed after one year and eighteen months, were entirely negative.

*Experiment 10, December 16, 1926:*

Two guinea pigs, two rabbits and five chickens were inoculated with B. C. G. (80), suspension M. The guinea pigs and rabbits were destroyed on the 243rd day after inoculation, with entirely negative results, and the chickens likewise.

*Experiment 11, October 14, 1926:*

Twenty guinea pigs were inoculated, ten subcutaneously and ten intraperitoneally, with 2.0-mg. doses of B. C. G. (17), suspension K. One guinea pig died from pneumonia on the 71st day, and showed suspicious lesions in the spleen. The nineteen other guinea pigs were killed after an observation period of one year and ten days, and in not a single case was there evidence of a tuberculous lesion.

*Experiment 12, November 5, 1926:*

Five guinea pigs were inoculated with B. C. G. (17), suspension L. One was destroyed on the 159th, two on the 286th, and two on the 462nd days after inoculation, and in none was there found any evidence or suspicion of tuberculous lesion.

*Experiments 13 and 14, April 13 and April 19, 1927:*

Four guinea pigs were inoculated with B. C. G. (17), suspension N, in doses of 10.0 to 20.0 mgs., and three guinea pigs with B. C. G. (17), suspension O, in 5-0.mg. doses. One guinea pig died on the 23rd day from an unknown cause and showed slight tuberculous lesion in the liver and in the mesenteric, axillary and inguinal lymph-glands. The six remaining guinea pigs, died or destroyed at the ninth to twelfth months of observation, were free from tuberculous lesions.

*Experiment 15, May 9, 1927:*

Six guinea pigs were inoculated subcutaneously with B. C. G. (17), suspension P, receiving 6.5 mgs. One guinea pig died from

extensive generalized tuberculosis on the 335th day. One, destroyed on the 342nd day, showed advanced generalized tuberculosis; another, destroyed the same day, only slight tuberculous lesions, limited to the mesenteric, cervical and axillary lymph-glands. One, destroyed on the 280th day, showed moderately extensive tuberculous lesions. The two remaining guinea pigs were entirely negative.

### Summary of Pathogenicity Tests

Summing up the experimental results thus obtained from 134 guinea-pig pathogenicity tests, made at different times and with different preparations of B. C. G. vaccine, we find 92 of the inoculated animals (68%) without any visible lesion or trace of tuberculous infection; but 30 (22.3%) with tuberculous lesions which in some cases may have been arrested and undergoing absorption but in others appearing suspiciously active; and 12 (9%) with extensive caseating generalized tuberculosis. In the six guinea pigs which died from tuberculosis in the first experiment (B. C. G. (80), suspension A), the shortest duration was five months, the longest eighteen months, and the average ten to eleven months.

Only five rabbits were inoculated and a few tubercles were found in the lung of one of these.

It appears, therefore, that our B. C. G. cultures possessed a low degree of virulence in that they caused, in addition to more or less localized and questionably benign lesions in about 22 per cent, generalized, typical tuberculosis in about 9 per cent of the inoculated guinea pigs after a relatively long period of infection.

*The virulence, however, was exalted by further serial guinea-pig passage;* and, as now carried from guinea pig to guinea pig, B. C. G. strains originating from vaccine suspensions A, H, I, and P, cause typical tuberculosis and death.

### Discussion

We are aware that these findings are in serious disaccord with those of Professors Calmette and Guérin and their collaborators, and with others who have affirmed that B. C. G. has been completely deprived of virulence, is not re-inoculable from animal to animal, is incapable of causing tuberculosis and is absolutely inoffensive and harmless. Our experimental results at the end of the first year (1926) were in conflict with the claimed innocuity of B. C. G. We thought it wise, however, to delay publica-

tion and repeat the experiments as often as necessary to establish unquestionable evidence. We continued for another two years and are still continuing these pathogenicity and virulence tests.

The results of one series of experiments would sometimes appear to be more or less in conflict with those of another series. After three and one-half years of experimental research on this question of virulence, we believe we are warranted in publishing the results, and we are not alone in questioning the proclaimed innocuity of B. C. G. Views and theories upon the degree of attenuation and virulence of B. C. G. and its mode of action have undergone considerable modification within the past year or two. It was at first suggested that the vaccine, when introduced into an animal subcutaneously, caused only a local focus of infection and exerted its action and immunizing effects from such a local focus. Now it is admitted that the inoculation of B. C. G. results in a bacillary invasion of the lymphatic system, causing a general reaction and hypertrophy of the lymphatic glands, and may even cause true tubercles in the lymph-glands, liver, spleen and mesentery. Nevertheless, it is still claimed that this is only a benign infection, that such lesions are not re-inoculable into guinea pigs, that they spontaneously heal and are actually related to the establishment and maintenance of immunity.

It is true that in the majority of our B. C. G.-inoculated guinea pigs which died from causes other than tuberculosis at an early stage of the experiment, the tuberculous lesions observed at postmortem examination, though limited and relatively slight, were nevertheless more prominent than those found in some other guinea pigs which died or were killed at later stages in the experiment. Furthermore, at still later stages or at the end of the experiment, many of the animals were entirely free from tuberculous lesions. These observations, up to a certain point, support the view of the benign character of the infection and of the tendency to spontaneous healing. Nevertheless, in a small minority of the animals, instead of healing and disappearing, or instead of a benign infection, the lesions slowly extended, multiplied and terminated in generalized caseating tuberculosis, and were then *transferable without difficulty from guinea pig to guinea pig*. Furthermore, inoculations made from the supposedly benign lesions failed in some instances, but were successful in others, in producing typical and fatal tuberculosis.

How can one explain occasional virulence of B. C. G. for guinea pigs as we have seen it in our experiments? In conducting numerous pathogenicity tests with many different strains of tubercle bacilli, we have frequently remarked that the more virulent the strain the more uniform and constant were the effects of it; and, on the other hand, the less the virulence of the infection the more variable and uncertain were the reactions to it. Although the guinea pig has a great susceptibility, it varies considerably in different individuals. In sensitizing guinea pigs with tubercle bacilli for tuberculin potency tests and standardization purposes, uniformity is particularly desirable and tried for, but it is a common experience, even when the inoculations are made with the same strain of tubercle bacilli, by the same route and in exactly the same dosage, to meet with a marked variability in the time and degree of sensitization and in the subsequent duration of infection.

Our guinea pigs subsist during the spring and summer months almost entirely upon fresh grass cuttings and green food, in the autumn and early part of the winter upon mangels and sugar-beet roots, and from January to April mainly upon dry hay and grain. It is during the latter period that their vitality and resistance to disease appears to be lowered and they are more subject to pneumonia and other diseases. Possible the same factors, seasonal and nutritional, play a part in lowering resistance to tuberculosis, though conceivably less in evidence and less important when the infecting tubercle bacilli are of high than when of low virulence.

All that we can say at this stage is that B. C. G. infection in guinea pigs is not always of a benign character, but may, in the course of time, develop into harmful activity and even lead to typical tuberculosis and death.

Experimental B. C. G. infection in the guinea pig may be of very long duration. It is not safe to say that the localized lesions which may be present at the third, sixth or ninth month, or even after one year, are of a wholly benign character, even though this may appear to be true in the majority of cases. In those of our guinea pigs which finally developed typical tuberculosis, the time required averaged ten to eleven months (in some cases more than one year). In one experiment (No. 9) it may be noted that in eleven out of twenty inoculated animals, after an average duration of nine months, no lesions were discernible;

and in the other nine, in which tuberculous lesions were found, the average duration was twelve and one-half months.

Summing up the duration period in all our pathogenicity tests, we find the following:

No lesions discernible in 94 guinea pigs (average duration—192 days).
Early, slight or localized in 32 guinea pigs (average duration—290 days).
Typical tuberculosis in 9 guinea pigs (average duration—309 days).

Does this not signify that *time* is an important factor in determining the virulence of B. C. G.?

The published reports of those conducting B. C. G. pathogenicity tests upon guinea pigs indicate, for the most part, that the observations were made upon animals killed two, three, four or five months after inoculation. Therein, possibly, lies an explanation, in part at least, of their negative findings or of finding only benign (?) lesions.

The work of S. A. Petroff, on "microbic dissociation" of tubercle bacilli, has a particular interest, as he claims to have separated B. C. G. cultures into two types of colonies which he designates as "R" and "S," one of which is non-virulent and the other virulent for the guinea pig.

The question of virulence is one of paramount importance and agitates the minds of those engaged in or contemplating the practice of B. C. G. vaccination.

We anticipate severe criticisms of our experiments and that there will be offered various explanations, other than that of virulence, of the results herein reported.

We can definitely eliminate any question of spontaneous or naturally acquired tuberculosis. For years we have followed the practice of submitting to postmortem examination every guinea pig which dies from natural causes or by accident in the small-animal breeding-houses, and we have not been able to discover a case of natural or spontaneous infection.

Furthermore, we have had occasion to record the interesting fact that normal, healthy guinea pigs, when placed as control animals in the same cage with tuberculous guinea pigs, and surviving the latter, appear to escape infection, as no lesions could be found in them when killed.

But to make doubly sure, and to eliminate any question of spontaneous infection, the B. C. G.-inoculated guinea pigs (experiments 5 to 15 inclusive) were confined in a building separate from all others, and where no other guinea pigs were housed.

As to possible contaminations of our cultures, we can only say that from the moment we received the B. C. G. samples from the Pasteur Institute, we realized the necessity of taking the utmost care and precautions to guard them and every series of subcultures against contamination, and we have, from the start, exercised all possible vigilance and safeguards. We are absolutely satisfied that it is neither a question of ulterior contamination of our guinea pigs nor of our cultures.

We submit that these experiments and the results therefrom are convincing enough to pose the question as one of virulence only. Accordingly, we have come to the following conclusions:

First, that Bacillus-Calmette-Guérin has not been entirely deprived of virulence, nor is it innocuous for all species of animals, particularly the guinea pig.

Second, that virulence is a *latent* property of B. C. G., requiring some unusual stimulus and, especially, *time*, to awaken it to activity.

Third, that it is capable of causing in some guinea pigs, after a long period of infection and tolerance, a progressive and fatal tuberculosis, which then becomes re-inoculable and transferable from animal to animal in serial passage.

## II. Experimental B. C. G. Vaccination Against Bovine Tuberculosis

An "Interim Report of Experiments on Calves in Relation to Susceptibility, Infection and Immunity," September, 1927,* included some experiments with B. C. G. vaccination of calves—groups VII A, VII B and X. Only those calves that had died or were killed were reported upon. All the calves, numbering twelve in the original group (VII B), and five out of ten calves since added to it (group VII C), have been killed. The conditions under which the experiments were made upon these seventeen calves are as follows:

The calves were born of tuberculin-tested, non-reacting cows in accredited herds and very soon after birth were removed to and segregated at the Government Experimental Farm, Ottawa, where they were fed on milk from tuberculin-tested, non-reacting cows until after vaccination with B. C. G. At the time of vaccination the calves were from four to seven days old and, with a reasonable certainty, were then free from tuberculous infection. Within the week following vaccination the calves were removed to a

*Jour. A. V. M. A., lxxi (1927), n. s. 24 (6), pp. 732-741.

TABLE I—*Pathogenicity tests on guinea pigs*

| EXPERIMENT | DATE OF INOCULATION | B.C.G. VACCINE | GUINEA PIGS (TOTAL NUMBER) | GUINEA PIGS INOCULATED WITH B. C. G. VACCINES (CULTURE TO GUINEA PIG): DEAD FROM CAUSES OTHER THAN TUBERCULOSIS — No. | DEAD FROM CAUSES OTHER THAN TUBERCULOSIS — DAYS | DEAD FROM TUBERCULOSIS — No. | DEAD FROM TUBERCULOSIS — DAYS | KILLED — No. | KILLED — DAYS | POSTMORTEM EXAMINATIONS TUBERCULOSIS LESIONS (SPLEEN, LIVER, LUNGS AND LYMPH-GLANDS): NO LESIONS DISCERNIBLE — No. | NO LESIONS DISCERNIBLE — DAYS | EARLY, SLIGHT OR LOCALIZED — No. | EARLY, SLIGHT OR LOCALIZED — DAYS | EXTENSIVE, ADVANCED OR GENERALIZED — No. | EXTENSIVE, ADVANCED OR GENERALIZED — DAYS | SERIAL ANIMAL PASSAGE WITH B. C. G. LESIONS (GUINEA PIG TO GUINEA PIG): 1ST | 2ND | 3RD | 4TH | 5TH | 6TH | 7TH | 8TH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1–20–25 | (80) A | 16 | 7 | 148 | 6 | 310 | 3 | 294 | 6 | 172 | 1 | 6 | 9 | 305 | + | + | + | + | + | + | + | + |
| 2 | 3–11–25 | " B | 2 | 2 | 30 | | | | | 1 | 32 | 1 | 29 | | | | | | | | | | |
| 3 | 5–13–25 | " C | 4 | 4 | 38 | | | | | 4 | 38 | | | | | | | | | | | | |
| 4 | 7–15–25 | " D | 2 | 2 | 64 | | | | | 2 | 64 | | | | | | | | | | | | |
| 5 | 12–24–25 | " E | 28 | 4 | 208 | | | 24 | 383 | 24 | 346 | 4 | 312 | | | | | | | | | | |
| 6 | 6–28–26 | " G | 2 | 2 | 94 | | | | | 2 | 94 | | | | | | | | | | | | |
| 7 | 8–27–26 | " H | 10 | 3 | 182 | | | 7 | 367 | 4 | 339 | 6 | 296 | | | | | | | | | | |
| 8 | 8–27–26 | " I | 10 | 4 | 279 | | | 6 | 371 | 4 | 367 | 6 | 312 | | | + | + | | | | | | |
| 9 | 8–27–26 | " J | 20 | 8 | 142 | | | 12 | 433 | 11 | 276 | 9 | 371 | | | + | + | + | + | + | | | |
| 10 | 12–16–26 | " M | 2 | | | | | 2 | 243 | 2 | 243 | | | | | — | — | | | | | | |
| 11 | 10–14–26 | (17) K | 20 | 1 | 71 | | | 19 | 376 | 19 | 376 | 1 | 71 | | | | | | | | | | |
| 12 | 11– 5–26 | " L | 5 | | | | | 5 | 331 | 5 | 331 | | | | | | | | | | | | |
| 13 | 4–13–27 | " N | 4 | 4 | 221 | | | | | 3 | 286 | 1 | 23 | | | | | | | | | | |
| 14 | 4–19–27 | " O | 3 | 2 | 293 | | | 1 | 351 | 3 | 312 | | | | | | | | | | | | |
| 15 | 5– 9–27 | " P | 6 | 2 | 159 | 1 | 335 | 3 | 338 | 2 | 184 | 1 | 342 | 3 | 319 | + | * | | | | | | |
| Guinea pigs Total numbers | | | 134 | 45 | | 7 | | 82 | | 92 | | 30 | | 12 | | | | | | | | | |
| Average duration in days | | | | | 157 | | 314 | | 365 | | 192 | | 290 | | 309 | | | | | | | | |
| Percentage | | | | 33.5 | | 5.4 | | 63 | | 68.7 | | 22.3 | | 9 | | | | | | | | | |

+ = Death from tuberculosis. — = Free from tuberculosis. * = Being continued.

TABLE II—*Experimental B.C.G.*

New-born calves, of tuberculin-tested, non-reacting cows (accredited herds), vaccinated with B.C.G. and subsequently exposed to natural infection (through the milk and by co-habitation with tuberculous cattle)

| | B.C.G. VACCINATION | | | | | DURATION OF TRIAL, AGE WHEN KILLED | |
|---|---|---|---|---|---|---|---|
| | CALF NO. | SEX | DAYS OLD | DATE | DOSE (MGS.) | YEARS | MONTHS |
| Group VII B | 87 | F | 7 | 1–9–26 | 75 | 1 | 3 |
| | 88 | M | 7 | 1–9–26 | 75 | 1 | 3 |
| | 89 | M | 7 | 1–9–26 | 75 | 1 | 3 |
| | 90 | M | 7 | 1–9–26 | 75 | 1 | 3 |
| | 92 | M | 7 | 1–9–26 | 75 | 1 | 3 |
| | 91 | F | 7 | (Non-vaccinated) | | 1 | 3 |
| | 94 | M | 7 | 1–9–26<br>5–9–27 | 75<br>100 | 1 | 10 |
| | 97 | M | 7 | 1–9–26 | 75 | 1 | 11 |
| | 95 | F | 7 | 1–9–26<br>5–9–27 | 75<br>100 | 2 | 1 |
| | 93 | F | 7 | 1–9–26<br>5–9–27 | 75<br>100 | 2 | 1 |
| | 96 | F | 7 | 1–9–26 | 75 | 2 | 1 |
| | 106 | M | 30 | (Non-vaccinated) | | 1 | 8 |
| Group VII C | 108 | M | 4 | 10–30–26 | 100 | 1 | 9 |
| | 111 | M | 4 | 10–30–26 | 100 | 1 | 9 |
| | 110 | M | 5 | 10–30–26<br>12– 9–27 | 100<br>75 | 1 | 9 |
| | 117 | M | 4 | 10–30–26<br>12– 9–27 | 100<br>75 | 1 | 9 |
| | 116 | F | 1 | (Non-vaccinated) | | 1 | 9 |

● = Caseous.
■ = Caseo-calcareous.
◆ = Calcareous.

*vaccination against bovine tuberculosis*

| Postmortem Examination (Tuberculous Lesions) | | | | | | | | | | Acid-fast Bacilli Present | | Guinea Pig Inoculation (Tests of Tuberculous Lesions) | Calf No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Submaxillary | Retropharyngeal | Peribronchial | Mediastinal | Mesenteric | Portal | Prefectoral | Pleura | Lungs | | Vaccinal focus | Tuberculous Lesions | | |
| | ● | | | ● | | | | | | | + | + | 87 |
| | | ■ | ● | ● | | | | | | | — | + | 88 |
| | | ■ | ■ | | | | | | | — | + | + | 89 |
| | | ■ | ■ | | | | | | | | + | + | 90 |
| | | ■ | ■ | | | | | ● | | | — | + | 92 |
| | | ■ | | | | | | | | | + | + | 91 |
| | | ◆ | ◆ | | | | | | | + | — | + | 94 |
| | | ■ | ◆ | | | | | ● | | — | + | + | 97 |
| | | ● | ● | ● | | | | ● | | + | + | + | 95 |
| | | ■ | ■ | ● | | | | ◆ | | — | + | + | 93 |
| | ● | ◆ | ◆ | | | | | | | | — | + | 96 |
| ● | ● | ■ | ■ | ● | | | | ● | | | | + | 106 |
| | | ● | ● | | | | | ● | | + | | (Under observation) | 108 |
| | ● | ● | ● | ● | ● | ● | | ● | | | + | | 111 |
| | | ● | ● | | | | ● | ● | | + | + | | 110 |
| | | ● | ● | | | | | ● | | + | + | | 117 |
| | | ● | ● | | | | | ● | | | + | | 116 |

segregated herd of tuberculin-reacting cows—a so-called "Bang" herd—and were fed until five to six months of age with the milk from these reacting cattle. They were then removed to the Research Station and were pastured and stabled with tuberculin-reacting cattle, remaining there until killed.

The calves were well fed and developed normally, maintaining a well-nourished condition throughout the entire period of observation and trial which varied from fifteen to twenty-five months. Five of the calves were re-vaccinated during the second year. Three calves remained unvaccinated as controls. The calves were killed at the Research Station where the autopsies, microscopical examinations and guinea-pig test-inoculations were carried out under laboratory conditions.

The experiments and results are shown in tables I and II.

*Group VII B (calves 87-96):*

Ten calves, seven days old, received a vaccinating dose of 75 mgs. (moist weight) of B. C. G. (80).

Five of these and one non-vaccinated control calf were killed after a delay of fifteen months. In all six calves definite lesions of more or less slight extent but typical of the early stages of tuberculosis were uncovered at postmortem examination. In two of these (89 and 91), one vaccinated, the other non-vaccinated, the discernible lesions, consisting of caseating focal areas, 2.5 by 1.2 cm. in extent, were limited to the bronchial lymphatic ganglia and the two cases were nearly identical. The lesions from each calf, inoculated into guinea pigs, caused generalized tuberculosis. In the four other calves two groups of lymphatic ganglia were visibly tuberculous and, in one of the four, the lungs, in addition, showed typical areas of tuberculosis. The lesions for the most part consisted of small tubercles, up to the size of a pea, some purulent, some caseous, others caseo-calcareous, but in calf 92 the entire glands and two small areas in the lungs were typically tuberculous.

Three of the remaining calves were re-vaccinated with 100 mgs. of B. C. G. (17) and these, with the two calves once vaccinated and the control non-vaccinated calf, were killed after a further delay of five to ten months, or twenty to twenty-five months after the commencement of the trial. In the six calves both bronchial and mediastinal lymphatic ganglia were tuberculous and in four of these pulmonary lesions were also discernible. In two of these calves, three groups of lymphatic

ganglia, as well as the lungs, were tuberculous. Vaccinated calf 95 gave lesions typical of active and progressive tuberculosis, no less but rather more extensive than in the non-vaccinated control, calf 106. Lesions from the ten vaccinated and the two non-vaccinated animals, in guinea-pig test-inoculations, were positive and productive of generalized tuberculosis.

*Group VII C (calves 107-117):*

Eight calves, four to five days old, received a vaccinating dose of 100 mgs. (moist weight) of B. C. G. (17).

Four of these, two of which had been re-vaccinated thirteen months later, and one non-vaccinated control calf, were killed after twenty-one months of trial (the remainder being held over for further delay). In each of these animals tuberculous lesions were uncovered, comparable to but more extensive and more active than those found in the preceding groups. Calf 111 had developed a generalized tuberculosis, involving the entire peribronchial and mediastinal lymphatic ganglia and the lungs. Extensive lesions were found also in the retropharyngeal, prepectoral, portal and mesenteric chains of lymph-glands.

These two groups of vaccinated calves were exposed to the same sources of natural infection, that is to say, they were associated with the same tuberculin-reacting cows, though cohabitation in group VII C was at a period ten months later than in group VII B.

On the whole, the lesions uncovered in the five animals in group VII C, after a delay of twenty-one months, were more numerous, extensive and progressive than those seen in the second half of group VII B, 20-25 months, which in turn were clearly more pronounced, more numerous and showed more caseation than those of the first half of group VII B, killed at the fifteenth month of trial.

Altogether the picture is one of slowly progressive tuberculosis and typical of the disease as naturally contracted and developing in young cattle of the age of these experiment animals. There are only three non-vaccinated as against fourteen vaccinated cattle, but as far as a comparison is possible with these unequal numbers, there is nothing in favor of the vaccinated nor any evidence to indicate a greater degree of resistance on their part to tuberculosis.

Furthermore, it is well to note that even though resistance may be increased as a result of B. C. G. vaccination, the vac-

cinated animal living in a tuberculous environment becomes a carrier of pathogenic tubercle bacilli no less virulent, as shown by the guinea-pig tests, than those carried by the non-vaccinated animal.

## Discussion

As already intimated, these experiments were undertaken in consequence of the published announcements of Professors Calmette and Guérin, in 1924, of their "New Method of Prophylaxis in Bovine Tuberculosis," which required only vaccination of the new-born calves by a subcutaneous inoculation of B. C. G. within fifteen days of birth and "before exposing them to massive infection or to discrete but repeated infections with virulent tubercle bacilli."

Particularly, we have followed with great interest and kept in mind the story of the tuberculous farm at Gruville, near Fecamp (Seine-Inferieure), 1921-1927, as related by Professors Calmette and Guérin, in the *Annales de l'Institut Pasteur.** The problem upon this farm, which for many years had suffered heavy losses from tuberculosis, in the translated words of the authors, was: "*Upon premises infected with tuberculosis, without changing in any way the mode of existence or the habitat of the animals, without modifying the customary methods of raising the calves, is it possible, through the ordinary course of births, by vaccinating the new-born within the first fifteen days of their life, and in re-vaccinating them each year, to eliminate tuberculosis from this farm in the space of five years?*"

Accordingly, the French veterinarians *suspended all prophylactic measures of isolation and disinfection*, and substituted B. C. G. vaccination.

The results, in the opinion of Calmette and Guérin and as reported in 1927, showed that B. C. G. vaccination had proved successful and had practically solved the problem of tuberculosis.

Particularly interesting is the mention of twenty calves born of tuberculous mothers or suspects which had been fed during their first months with the raw unheated milk of the mothers, and which, along with ten others, or thirty in all, vaccinated and revaccinated, arrived at the abattoir free from any tuberculous lesion.

We have endeavored to repeat some of these experiments upon young cattle with the object of proving the "*simplicity, innocuity*

*Vol. xxxviii (1924), p. 393; vol. xli (1927), p. 17.

*and efficacy*" of B. C. G. vaccination as applied to the farm at Gruville.

The conditions under which our experiments were carried out were not quite the same, it is true, as those at Gruville. We decided against conducting the trial upon a privately-owned herd, but to purchase the animals and keep them continuously under our own control and constant observation.

The conditions, as compared with those at Gruville, were in favor of our animals, as they were purchased from accredited, tuberculosis-free herds, and were the offspring of tuberculin-tested, non-reacting parents, thus fulfilling the essential condition laid down, namely, that the calves must be *vaccinated before exposure to infection*. Subsequently these calves, including non-vaccinated controls, which, it may be remarked, were lacking at Gruville, were fed the milk of tuberculous or suspected cows as was done at Gruville, with the unhappy result that all of the seventeen animals in the experiment were found with tuberculous lesions when killed at the laboratory abattoir.

We must now state, however, that, in 1927, Professors Calmette and Guérin introduced an important modification of the conditions under which B. C. G. vaccination should be practiced, namely, the isolation of calves, feeding them only boiled milk and guarding them against possible contamination for thirty days after vaccination—a reasonable condition for the establishment of immunity prior to virulent infection, but one which destroys much of the "simplicity" of B. C. G. vaccination and must in many instances be difficult to apply. We assume that results have been reported, though not published, similar to ours, making this important modification advisable and necessary.

We now have a new series of calves under experimental B. C. G. vaccination and under the new condition of isolation, and so forth, for thirty days.

At the present time, in view of the results of our experiments and in spite of the extensive trials or practice of B. C. G. vaccination in Europe and in the French colonies, we feel that we are fully warranted in considering B. C. G. vaccination as in the experimental stage, and, in respect to its innocuity and efficiency, open to question.

ACKNOWLEDGMENTS AND THANKS

First, to Professors Calmette and Guérin for their kindness in sending me cultures of their bacillus B. C. G., also for the per-

sonal interviews accorded me and for the privilege of visiting the farm at Gruville under their own guidance. To Hon. W. R. Motherwell, Minister of Agriculture, and to Dr. Geo. Hilton, Veterinary Director General, for authorizing these researches and the financial provisions for carrying them out. To Dr. E. S. Archibald, Director of Experimental Farms, and to Mr. Geo. B. Rothwell, Dominion Animal Husbandman, for facilities afforded and for placing animals at our disposal.

## U. S. CIVIL SERVICE EXAMINATION

The United States Civil Service Commission announces an open competitive examination for junior veterinarian to fill vacancies in the Bureau of Animal Industry, Department of Agriculture, for duty in the field. The entrance salary is $2,000 a year. Positions carrying higher salaries are filled through promotion.

Applicants must have been graduated from a recognized veterinary college and those participating in the examination will be rated on veterinary anatomy and physiology, veterinary pathology and meat inspection, and theory and practice of veterinary medicine.

Full information may be obtained from the United States Civil Service Commission, Washington, D. C., or from the secretary of the United States Civil Service Board of Examiners at the post office or customhouse in any city.

Applications for this examination must be on file with the Civil Service Commission at Washington, D. C., not later than November 20.

For this position the Department of Agriculture wishes men.

## VETERINARY HOSPITAL FOR ARGENTINA

On May 11, 1928, the School of Agriculture and Veterinary Medicine of the University of Buenos Aires, Argentina, opened three new buildings for its hospital on the grounds of the school. One of these buildings is the surgical ward, the second is for pure-bred horses and the third is for ordinary horses. Sheep, hogs, dogs and cats will also be treated. When the hospital is complete, there will be fifteen buildings, distributed over an area of nearly ten acres.

—*Bulletin of the Pan-American Union.*

# THE FEDERAL FOOD AND DRUGS ACT AND THE INSECTICIDE ACT: THEIR IMPORTANCE TO THE VETERINARY PROFESSION, AND PERSONAL EXPERIENCES IN THEIR ENFORCEMENT*

*By* B. T. WOODWARD

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From the professional viewpoint, the success of the veterinary practitioner of today and that of his predecessors extending even back beyond the organization of the first veterinary college, depends upon his knowledge and skill as a surgeon, his skill as a diagnostician, his knowledge of the therapeutic action of drugs and the reliability of drugs in producing the expected results in such a manner that there was created in the owner of the animal a feeling of faith in the veterinarian and in drugs themselves. The practitioners of human medicine, in the large numbers in which they are distributed, have not been able to supply all of the needs and demands of the public for the drugs to assist nature in combating various diseases and conditions.

In the veterinary profession, this condition has been true to a greater extent, and today with the decreased enrollment in our veterinary colleges, there exists an actual need for the distribution of drugs and the dissemination of the knowledge of their actions to the increasing number of owners of live and pet stock, who are unable, through no fault of their own, to secure the professional services of a qualified veterinarian. Without considering the welfare of the members of the veterinary profession, the Congress of the United States looked to the welfare of the animal population and to the protection of its owners.

In 1906, there was passed the Federal Food and Drugs Act, and in 1910, the Federal Insecticide Act. Basically, the purposes of both of these Acts are to protect the public from the false and fraudulent claims of the therapeutic efficiency of drugs and the value of insecticides and disinfectants, and to enable the public, with its constantly increasing enlightenment, to select proprietary preparations of drugs and chemicals with the assurance that

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the claims made upon the labels would be substantiated in the experience of the user.

It is with regret that I must acknowledge that, following the passage of the Food and Drugs Act, there elapsed a period of probably twenty years during which the veterinarians individually and in their organizations failed to appreciate the wonderful value of the congressional acts in stimulating faith in the value of drugs and in the veterinary profession, and failed to participate ethically in the enforcement of these Acts. The U. S. Bureau of Chemistry was charged by Congress with the enforcement of the Food and Drugs Act, and this unit of the government found that it did not have any veterinarian upon its rolls.

In 1908, the Bureau of Animal Industry detailed me as a consulting and cooperating veterinarian to the Bureau of Chemistry. The requests of this Bureau for assistance were at that time few and irregular. If the veterinary practitioners of the country had realized the importance of the enforcement of this Act to their personal welfare and to the progress of their profession, their influence would have changed this condition until the Bureau of Chemistry recognized the veterinary proprietary preparation as the most important feature in the enforcement of the law as it related to misrepresentations of therapeutic claims.

## Seriousness of Situation Realized

Time passed onward and cases against the manufacturers of these preparations were dropped on account of age limitations and the fact that there was no organized interest urging them to early judgment. Gradually a realization of the seriousness of the situation was brought home to the Bureau of Chemistry, not by the veterinarian but by the stock-owner, who suffered extensive losses by treating his live-stock with fake remedies, and through the interest of the Bureau of Animal Industry, particularly in reference to preparations which were offered for the prevention, treatment or cure of the communicable diseases of live stock against which the Bureau was waging an active war.

The increased activity of the Bureau of Chemistry met with an immediate response from the unscrupulous or ignorant manufacturer or distributor, and political pressure was brought to bear in every possible way upon the government officials. At this point, I wish to state clearly that such pressure has in no case, to my knowledge, resulted in a lack of the enforcement of the law or overlooking its requirements, although, on account of

this influence, enforcing officials at times met with many difficulties, delaying the final action upon cases.

When a manufacturer was notified that his veterinary preparations were being sold in interstate commerce in violation of the law, it became common practice for him to come to Washington armed with letters which he considered to be of political weight and accompanied by an attorney. Through many long hours of conferences, it has usually been my experience to find that the attorney employed in such cases is interested solely in determining the limit to which his client may go in making claims for the effects of his preparation without technically violating the law and thus making him liable to action under its provisions. The lawyer was not interested in this spirit of honesty upon the labels, of fairness to the purchaser, or of the welfare of the live stock industry.

To the discredit of individuals in our profession, it must be told to our Association, that qualified veterinarians employed by manufacturers appeared in their behalf and showed the same attitude as that exhibited by the attorneys, and in some cases the veterinarian was also the manufacturer making the false and fraudulent claims.

It is refreshing to tell you that in recent years there has been a constantly increasing number of manufacturers or distributors who have voluntarily appeared before the officials in Washington for the purpose of obtaining the knowledge which would enable them to make the claims on all of the labels to agree with both the spirit and the letter of the law. For illustration of the conditions experienced in enforcement, I will present a few examples:

### Bowman Abortion Remedy

First, because it is familiar to many of you by name, let me cite the case of the Bowman Abortion Remedy. The chemical analyses of this remedy, as made by both federal and state laboratories, indicate that it consisted of brown sugar in approximately 85 per cent and ground bran or waste meal products to make up the remainder. A company was organized in Minnesota to manufacture, advertise and sell this product, which at one time claimed to be 100 per cent efficient in preventing abortion in cattle and was guaranteed to overcome sterility in both the cow and the bull, to assure the birth of calves without a dystokia, and that the calves would not be susceptible to pneumonia or dysentery.

A nine-pound package was sold for $5.00. Three pounds were given to an animal on alternate days until three doses had been given. All the results claimed for it were to be attained without regard to the pregnancy or non-pregnancy of the animal treated, and the protective value of this preparation against contagious abortion was to remain effective for at least one year. This preparation and its extremely extensive advertising probably did more to arouse the veterinary profession to the dangers of the lack of enforcement of the Food and Drugs Act than any other case which has reached the federal courts.

Having a knowledge of the existence of this so-called remedy before its distribution was undertaken, I was enabled to secure some of the earliest advertisements and had the privilege of originating the investigation against it. As soon as this investigation was undertaken, strenuous efforts were brought to bear to nullify it and certain members of the United States Senate and House of Representatives appeared in its behalf. Despite the fact that every veterinarian knew the falsity and fraudulency of the claims for this preparation, it became necessary for the government to conduct scientific tests of it in the field and laboratory. This work and other influences greatly delayed the progress and final action upon the case.

### Other Abortion Remedies Appear

As this case was developed, it was a surprise to disclose the action of several licensed veterinarians who were semi-secretly selling this fake preparation on commission to clients who employed them for the honest treatment of their live stock. During this period, a new lot of preparations offered for contagious abortion was constantly making its appearance, and the delays in the procedure of the Bowman case effectually, though temporarily, tied the hands of enforcing officials against these new preparations and others upon which action had been started.

Eventually, shipments of Bowman's Abortion Remedy were seized by United States marshals and the case was brought in the Federal Court at Cleveland, Ohio. In preparing this case, I visited veterinary practitioners and the veterinary educational institutions in the United States, and when I returned to the Washington headquarters, I felt unusually proud of my profession in reporting the universal response which I had had for veterinarians of the highest calibre to appear as expert witnesses for the government, solely in the interest and the welfare of their

profession and of the live stock industry. The case was decided in favor of the government, and a sweeping and valuable decision was handed down by the judge.

Following the close of this case, action was promptly instituted against the remainder of approximately thirty manufacturers of so-called abortion remedies and, at the present time, I feel safe in stating that at least a very large majority of these preparations have been absolutely removed from the market, or their labeling so changed as to remove any reference to abortion or its allied conditions.

The veterinary activities of the Bureau of Chemistry were showing a continuous and active growth when a reorganization within the Department of Agriculture was authorized by Congress. In this reorganization, it was directed that I assume charge of the enforcement of the laws relating to veterinary preparations coming within the scope of both the Food and Drugs Act and the Insecticide Act. This specializing centralization permitted the establishment of a definite campaign looking toward the removal from interstate commerce of all proprietary preparations alleged to be a preventive, treatment or cure for the communicable diseases of live stock and poultry. This campaign was made active against preparations relating to each class of farm animals and pet stock, as well as chickens and turkeys.

### Violent Reaction Occurs

Again in the history of the enforcement efforts, a violent reaction occurred. There were threats of legal proceedings to hamper the government by the combining of manufacturers for the purpose of employing high-priced legal talent to combat the laws, and even congressmen appeared and fought in behalf of their constituents, although it was demonstrated to them that the sale of such medicines by their constituents was not only defrauding the public, but was an actual menace to the great live stock industry.

Stop for a moment and consider the effects which were being instilled in the minds of the owners of animals. Medicines were being purchased with labels promising definite results. These results did not follow, and the purchaser usually did not blame the manufacturer who sold the medicines with false claims of efficiency, but considered that drugs themselves were failures. As drugs are used by the veterinary practitioner, the loss of faith

in the action of drugs was reflected in the lessened use of the services of the veterinarian.

The creditable activity of the veterinary profession and the cooperation of organized live stock owners year after year resulted in the appropriating of constantly increasing sums of money by the federal and state governments to combat and eradicate the great animal plagues. To expend these moneys, live stock sanitary legislation was passed.

It is well recognized that there is always an element of the public which combats any effort toward regulation or control. The unscrupulous manufacturer of proprietary medicines recognizes this element and capitalizes upon it. It is these people who purchase the fake remedies, who attempt to hide the presence of communicable diseases in their live stock, and who, by this combination, serve to create and maintain what are, for at least a time, hidden centers from which disease is disseminated, causing severe losses to their neighbors and endangering the live stock industry.

### Veterianarians Slow to Participate

In his constant fight for recognition and utilization as a highly specialized professional man, the veterinarian was still failing to recognize or absolutely refusing to engage actively in the battle which was being waged by federal and state governments to make it impossible for the live stock owner to be imposed upon by the sale of false and fraudulent remedies.

During the 1927 meeting of the American Veterinary Medical Association, an epochal step was taken by the formation of the Committee on Proprietary Pharmaceuticals. This Committee will endeavor to arouse every member of the Association and of the profession to the importance of his duty in directing attention to every proprietary preparation sold within his territory which makes false and fraudulent therapeutic claims.

This Committee has before it one of the most important lines of activity which has ever been entered upon by its parent association. The scope and value of its work will be limited only by the time which its members are enabled to give to it and the needed financial backing which it receives from the Association. The Committee should unreservedly cooperate with the U. S. Food, Drug and Insecticide Administration, and in this combination of activities, the largest and most rapid

results should be continually attained in protecting the live stock owner from false medicines.

Another valuable adjunct will be the establishment, through this Committee, of an advisory service to the publishers of magazines and newspapers, which will enable them to reject from their advertising columns the advertisements of preparations which do not meet the requirements of the Committee and are in violation of the federal laws.

### Functions of the Committee

The following four purposes of the Committee provide a definite basis upon which its activities are being formulated:

*First:* To investigate and report upon the accuracy of therapeutic claims and the fact or falsity of any and all statements appearing upon the labelling and in collateral advertising, both printed and verbal, of proprietary pharmaceuticals offered to the veterinary profession and to the public.

*Second:* To publish the reports of these investigations in the Journal of the American Veterinary Medical Association, including a statement of the decision of the Committee in regard to the compliance or non-compliance of the preparation with its requirements.

*Third:* To publish in the Journal of the American Veterinary Medical Association the Notices of Judgment obtained in the federal courts by the U. S. Food, Drug and Insecticide Administration against manufacturers or distributors of proprietary preparations, veterinary and otherwise, as may be judged to be for the best interests of the veterinary profession, the labelling of which was in violation of the federal laws.

*Fourth:* To pass upon the acceptability for publication in the Journal of the American Veterinary Medical Association of any and all advertisements submitted to appear in that publication and relating in any manner to any proprietary preparation.

Let me urge every member of the Association to perform his duty in reporting to the Committee detailed facts relating to the sale of any preparations which he considers are harmful to the live stock owner and the veterinary profession and, if he desires, he should also file this information with the Federal Food, Drug and Insecticide Administration for its attention. Feel assured that the government will not overlook this information.

The manufacturer will be given an opportunity to correct his labelling, or, if necessary, to discontinue the sale of his prepara-

tion without legal action being instituted. If the manufacturer refuses to take advantage of these opportunities, the laws provide for the seizure, by order of the United States Courts, of the preparations which are moved in interstate commerce or the inauguration of criminal proceedings against the shipper.

The Association is to be congratulated upon the personnel which has been selected for this most important committee. For the accuracy and uniformity of its decisions, it is suggested that its members serve for a period of at least five years, and that successive appointments to this Committee be made annually for such a period of service.

Let us remember that proprietary remedies have always had a legitimate place in providing a home treatment for the minor diseases and ailments of animals, and with the present scarcity of graduate veterinarians in many farming districts of the United States, a still greater need for proprietary preparations which have a real and known value in the treatment of live stock and poultry has developed.

## A REMARKABLE RECORD

During the session of the Missouri State Board of Veterinary Examiners, held at Sedalia, August 20-21-22, one of the applicants was Dr. J. I. Gibson, ex-state veterinarian of Iowa, and at present consulting veterinarian to the Hillyard Chemical Company, of St. Joseph, Mo.

It has been forty-two years since Dr. Gibson was graduated from the Ontario Veterinary College, and a man with such a long career in back of him is always supposed to be rusty. However, Dr. Gibson has succeeded in keeping the machinery very bright, probably with the use of midnight oil, as he passed one of the most technical and finest examinations written by any applicant coming before the Missouri Board for the past several years. This is indeed a remarkable record for a man of Dr. Gibson's age, as a lot of water has run under the bridge since the day of his graduation as a young man back in Canada, almost a half-century ago.

This incident should be a stimulus to the members of the younger generation to keep abreast of the times, and not permit themselves to fall into the rut which commonly receives the average man in any walk of life.

H. A. W.

# A MEDIUM FOR THE ISOLATION OF SALMONELLA PULLORUM AND OTHER MEMBERS OF THE PARATYPHOID GROUP FROM AVIAN TISSUES.

*By* W. L. MALLMANN, FRANK THORP, JR., *and* MARGARET SEMMES

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The usual method of isolating organisms from avian tissues consists in smearing sections of the various organs over the surface of a solid medium. Usually the medium used is selected on the basis of its ability to grow the desired organism. No attempt is made to use so-called selective media, such as are used in feces examination and water analysis. Very frequently in the diagnostic laboratory dealing with poultry, specimens are received in such a state that the tissues have become invaded by saprophytes, rendering a bacteriological examination impossible. Quite frequently plate cultures made from freshly killed fowls are overgrown completely by spreaders and *Escherichia coli*. The use of a selective medium should help to eliminate such difficulties.

Many antiseptic substances have been recommended as inhibitory agents in nutrient media, and of these the only effective ones appear to be the aniline dyes. The antiseptic properties of the aniline dyes have been known for many years. As early as 1890, Cornil and Babes[1] observed the germicidal properties of crystal violet. In 1902, Conradi and Drigalski[2] recommended the use of crystal violet in nutrient media used for the isolation of *Escherichia coli* and *Eberthella typhi*. Since then a multitude of papers has appeared on the use of dyes as selective agents in nutrient media.

In 1913, Torrey[3] recommended the use of brilliant-green broth as an enrichment medium for the isolation of paratyphoid organisms. He found that *Salmonella schottmulleri* and *Salmonella enteritidis* were unaffected by this dye, while Gram-positive organisms and *Escherichia coli*, *Eberthella dysenteriae* and *Alkaligenes fecalis* were inhibited. So great was the specific action of this dye that even when *Salmonella schotmulleri* was mixed with *Escherichia coli* in the ratio of 1 to 180,000, the *Salmonella*

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*schotmulleri* would develop on smeared plates while the *Escherichia coli* would be completely suppressed.

In 1922, Winslow and Dolloff[4] reported that the presence of bile salts reduced the activity of brilliant green in enrichment media. They reported that the presence of the bile salts reduced the bacteriostatic effect of brilliant green from 1 to 1,000,000 in plain lactose broth to 1 to 1,000 in lactose-bile broth. No explanation of this action is presented.

In 1927, Rakieten and Rettger[5] confirmed the work of Torrey with the paratyphoid organisms. They found that the activity of the brilliant green is influenced by the reaction of the medium. An acid medium favored the activity of the dye, while an alkaline medium suppressed its activity materially.

Our problem was to find a selective inhibitory agent that would suppress the development of all Gram-positive organisms and such Gram-negative organisms as *Escherichia coli* and allow the unrestricted development of members of the paratyphoid group, particularly *Salmonella pullorum*, *Salmonella gallinarium* and *Salmonella anatum*.

Accordingly, the following organisms were selected for the study: *Salmonella pullorum*, *Salmonella gallinarium*, *Salmonella anatum*, *Eberthella typhi*, *Escherichia coli*, *Staphylococcus aureus* and *Bacillus mycoides*.

Brilliant green was the only dye that had selective properties of the nature desired, as far as the literature reveals. However, the writers selected five dyes for a confirmatory study, inasmuch as these members of the paratyphoid group have not been studied in this manner. The five dyes selected were brilliant green, crystal violet, gentian violet, basic fuchsin, and acriflavine. These dyes were made up to one per cent aqueous solution, diluted to 1 to 1,000, filtered and stored in the ice-chest until used.

The medium used was standard meat-extract broth (A. P. H. A. Standard Methods for Water Analysis) to which appropriate dilutions of the dyes were added.

All tubes were inoculated with a loopful of a 24-hour broth culture of the desired organism. Tubes were incubated at 37° C. and readings were made at the end of 24- and 48-hour intervals. All tubes failing to show growth and those in which opacity produced by the dye rendered observation uncertain, were cultured into plain nutrient broth to determine the presence of viable organisms. In the case of the negative tubes, this pro-

cedure demonstrates whether the lack of growth was due to inhibitory action of the dye or to germicidal properties.

### Results of Tests of Different Dyes

*Basic fuchsin:* A dilution of 1 to 1,000 inhibited the growth of *Escherichia coli, Salmonella gallinarium, Salmonella pullorum, Eberthella typhi* and *Salmonella anatum,* while the next higher dilution (1 to 10,000) gave unrestricted growth of all of them. Dilutions up to 1 to 150,000 inhibited the development of *Staphylococcus aureus* and *Bacillus mycoides.* No selective properties were evident other than the suppression of Gram-positive organisms.

*Acriflavine:* A dilution of 1 to 10,000 inhibited the growth of *Escherichia coli, Salmonella pullorum* and *Salmonella anatum,* while dilutions of 1 to 30,000 inhibited *Eberthella typhi. Salmonella gallinarium* grew in all dilutions tested (1 to 10,000 and greater). *Staphylococcus aureus* and *Bacillus mycoides* were inhibited by dilutions of 1 to 50,000 but not 1 to 100,000. Acriflavine appears to favor the development of *Escherichia coli* and the paratyphoid organisms, particularly *Salmonella gallinarium,* but has no practical significance.

*Gentian violet: Salmonella gallinarium, Salmonella pullorum* and *Salmonella anatum* grew in all dilutions (1 to 5,000 and greater) tested, while *Escherichia coli* and *Eberthella typhi* were inhibited in dilutions of 1 to 20,000 and 1 to 30,000 respectively. *Bacillus mycoides* and *Staphylococcus aureus* were inhibited in all dilutions tested (up to 1 to 100,000). This dye inhibited the development of *Escherichia coli* as well as the Gram-negative organisms, but again the differences in dilutions were not enough to warrant its use.

*Crystal violet:* The results with this dye, as might be expected from its chemical formula, were identical with those obtained with gentian violet.

*Brilliant green: Salmonella gallinarium, Salmonella pullorum* and *Salmonella anatum* grew in all dilutions tested (1 to 10,000 and above). *Eberthella typhi* was inhibited by dilutions of 1 to 50,000, but grew abundantly in 1 to 100,000. *Escherichia coli* gave only slight growth in 1 to 300,000, while *Bacillus mycoides* and *Staphylococcus aureus* grew slightly in 1 to 750,000. This dye allowed the development of the avian paratyphoid bacteria but inhibited *Escherichia coli* and Gram-positive organisms. The results are comparable to those obtained by Torrey and later

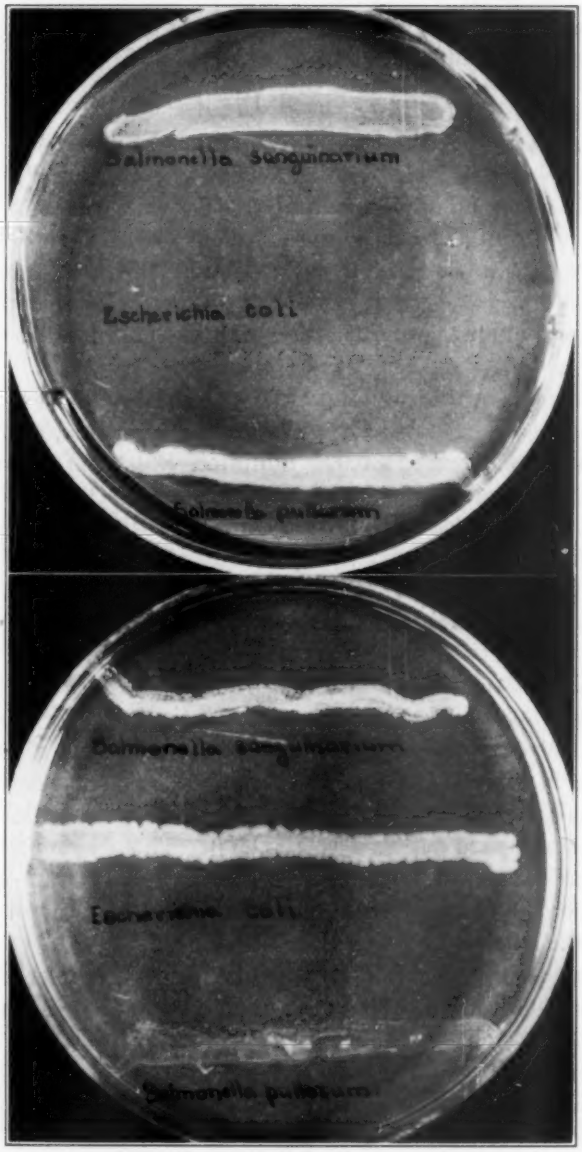


FIG. 1 (above). Effect of brilliant-green (1 to 100,000) liver-agar on *Salmonella Sanguinarium, Escherichia coli* and *Salmonella pullorum.*

FIG. 2 (below). Growth of *Salmonella sanguinarium, Escherichia coli* and *Salmonella pullorum* on plain liver-agar as compared with brilliant-green liver-agar (fig. 1).

by Rakieten and Rettger with *Salmonella paratyphi, Salmonella schotmulleri* and *Escherichia coli.*

Since the five dyes studied behaved as would be indicated by results of previous investigators, no other dyes were tested. Since brilliant green possessed all the properties desired, this dye was selected for further studies.

The effect of brilliant green was next tested in a solid medium. A liver-infusion-agar base was used. This medium gives an abundant growth of all the avian paratyphoids and is used in this laboratory for all routine work involving these organisms. The medium was prepared according to the methods recommended by Huddleson[6] except that equal amounts of liver and beef infusion were used. The reaction was adjusted to pH 7.

The dye was added to the medium in varying amounts and thick plates were poured. These plates were smeared across the surface with loopfuls of the various organisms. The plates were incubated for 24 hours at 37° C.

The strongest concentration (1 to 50,000) produced no inhibitory effect upon *Salmonella gallinarium* and *Salmonella pullorum,* while *Eberthella typhi* and *Salmonella anatum* grew scantily. On 1-to-75,000 all of the above organisms grew abundantly. *Escherichia coli* was inhibited up to a dilution of 1 to 150,000. Figures 1 to 4 show the appearance of the streak cultures on 1-to-100,000 brilliant-green liver-agar compared with the controls on plain liver-agar. *Staphylococcus aureus* and *Bacillus mycoides* were inhibited in the highest dilution (1-200,000) used.

The tests were repeated on a new batch of liver-infusion-agar medium. The results were similar except that *Escherichia coli* grew in a dilution of 1 to 150,000 but not in a dilution of 1 to 125,000. The bacteriostatic effect of the brilliant green varies slightly in different batches of the same medium.

This solid medium gave the desired results when combined with the proper concentration of the brilliant green. The next step was to check the medium under routine conditions.

### Routine Application of Brilliant Green Agar

A flock of 53 cull birds was autopsied and cultured. Shortly after being killed, each bird was carefully autopsied and all organs destined for bacteriological examination were immediately cultured or stored in the ice-chest to prevent decomposition. All organs were cultured on plain liver-agar and brilliant-green (1 to 75,000 )liver-agar. The plates were examined at the end

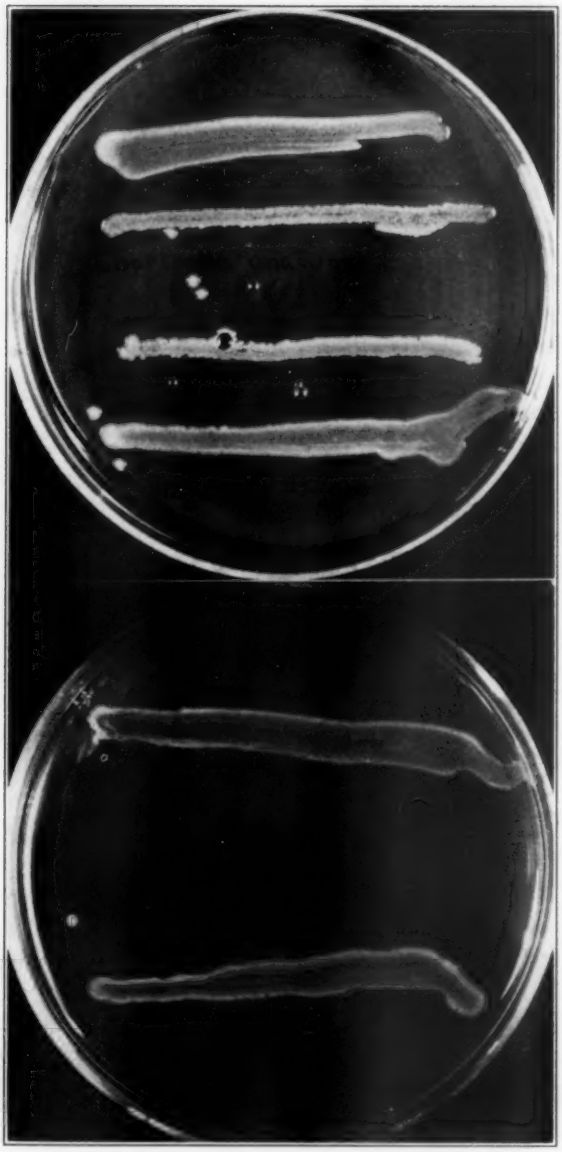

FIG. 3 (above). Effect of brilliant-green (1 to 100,000) liver-agar on *Salmonella anatum* and *Eberthella typhi*.

FIG. 4 (below). Growth of *Salmonella anatum* (upper-streak) and *Eberthella typhi* (lower streak) on plain agar, as compared with brilliant-green liver-agar (fig. 3).

of 24- and 48-hour intervals. All colonies were fished, except those that obviously resulted from contamination. These cultures were replated, to assure pure cultures, and then tested on glucose, mannitol, sucrose, maltose and lactose to determine their fermentative properties. Gram stains also were prepared. The pure cultures were smeared on plain liver-agar and brilliant-green (1 to 75,000 and 1 to 150,000) liver-agar to determine their resistance to the dye.

The plain liver-agar allowed the growth of numerous Gram-positive contaminants, spore-forming bacilli (spreaders) and Gram-positive cocci. In many instances, the growth of these contaminants would have precluded the growth of *Salmonella pullorum* and allied organisms. The brilliant-green liver-agar plates smeared from the same tissues were practically free from contamination. Gram-positive organisms, when they did appear, remained small, discreet colonies and appeared at the beginning point of the inoculation streaks where deposition of material from the tissues was heavy. It seems quite probable that this material acted as a source of food for these organisms or suppressed the bacteriostatic effect of the brilliant green. This is particularly true of the ovaries, when heavy depositions of egg-yolk occurred. The amount of contamination on the brilliant-green plates was extremely small in every instance and offered no hindrance to the development of the desired bacteria.

Heavy growths of *Escherichia coli* were obtained from 12 ovaries on plain liver-agar. In nearly every case, the development of *Escherichia coli* was so extensive that the development of *Salmonella pullorum* would have been impossible. Gross contamination by *Escherichia coli* is very common, especially when birds are killed before being shipped to the laboratory or die in transit.

In nearly every case, where *Escherichia coli* was found on the plain liver-agar, it was isolated also from the brilliant-green liver-agar. Here again, as in the case of the Gram-positive organisms, the amount of growth was scanty and limited to the beginning point of inoculation. It would not interfere in any manner with the isolation of *Salmonella pullorum.*

*Salmonella pullorum* was isolated from the ovaries of two birds. The amounts of growth on the plain liver-agar and the brilliant-green liver-agar were practically identical. No contamination was present on either set of plates.

FIG. 5 (above). Smear of liver from chick infected with bacillary white diarrhea, showing pure culture of *Salmonella pullorum* on brilliant-green (1 to 75,000) liver-agar.

FIG. 6 (below). Smear of same liver on plain liver-agar, showing gross contamination by spore-forming spreaders, which have suppressed the appearance of *Salmonella pullorum*.

The value of this medium is clearly demonstrated in figures 5 and 6. Smears were made from the liver of a chick infected with bacillary white diarrhea. The plain liver-agar plate was completely covered with Gram-positive spreaders, whereas the brilliant-green-liver-agar plate gave discreet colonies of *Salmonella pullorum* and no contamination. In our routine laboratory work we have had a number of similar instances, where the brilliant-green-liver medium gave pure cultures of *Salmonella pullorum* and the plain liver-agar was completely covered with *Escherichia coli* or Gram-positive spreaders.

As previously stated, Escherichia coli, from the tissues plated, grew to a slight extent on the brilliant-green medium. To determine their resistance to the dye, in pure culture, these organisms together with the Gram-positive spore-formers and cocci were smeared on brilliant-green (1 to 75,000 and 1 to 150,000) liver-agar. The effect of the liver infusion on the dye was determined also by including a set of brilliant-green (1 to 75,000 and 1 to 150,000) plain-agar plates. The results are given in table I.

Without exception, all of the Gram-positive bacilli and cocci were completely inhibited by the brilliant green in both the plain and liver-agar media. Both sets of control plates produced abundant growth with these organisms.

In the case of *Escherichia coli* and *communior*, the results were quite different. In every case these organisms grew on the brilliant-green agar medium. The growth, however, was scanty on the brilliant-green medium, whereas growth on the control medium was abundant.

The brilliant-green meat-extract agar produced less growth than the liver-agar, showing that the liver-agar contained some substance that causes a slight suppressive action of the brilliant green. Winslow and Dolloff, as previously mentioned, found that the addition of bile to brilliant-green lactose broth reduced the selective activity of the dye to a marked degree. It is quite possible that the liver contains a sufficient amount of bile salts to cause the reduction in activity observed in the experiments cited above. The suppressive action of the liver medium is so slight that it does not seriously interfere with the selective activity of the brilliant green.

The bacteriostatic quality of the brilliant green used was questioned, due to the fact that slight growths of *Escherichia coli* appeared in the presence of the dye.

TABLE I—*Effect of brilliant green in plain extract-agar and liver-agar on pure cultures of organisms isolated from plates (both plain liver-agar and brilliant-green liver-agar) of chicken tissues*

| CULT. | KIND OF ORGANISM | GRAM STAIN | CONTROL | | BRILLIANT-GREEN PLAIN-AGAR | | BRILLIANT-GREEN LIVER-AGAR | |
|---|---|---|---|---|---|---|---|---|
| | | | PLAIN AGAR | LIVER AGAR | 1–75000 | 1–750000 | 1–75000 | 1–150000 |
| 1 | Bacillus | + | ++++ | ++++ | — | — | — | — |
| 2 | Bacillus | + | ++++ | ++++ | — | — | — | — |
| 3 | Bacillus | + | ++++ | ++++ | — | — | — | — |
| 4 | Bacillus | + | ++++ | ++++ | — | — | — | — |
| 5 | Bacillus | + | ++++ | ++++ | — | — | — | — |
| 6 | Bacillus | — | ++++ | ++++ | — | — | — | — |
| 7 | Bacillus | + | ++++ | ++++ | — | — | — | — |
| 8 | *E. communior* | — | ++++ | ++++ | ± | ++ | ± | +++ |
| 9 | Coccus | + | ++++ | ++++ | — | — | — | — |
| 10 | Coccus | + | ++++ | ++++ | — | — | — | — |
| 11 | Coccus | + | ++++ | ++++ | — | — | — | — |
| 12 | *E. communior* | — | ++++ | ++++ | — | + | — | +++ |
| 13 | *E. communior* | — | ++++ | ++++ | — | ± | ± | ++ |
| 14 | Bacillus | + | ++++ | ++++ | — | — | — | — |
| 15 | Bacillus | + | ++++ | ++++ | — | — | — | — |
| 16 | Coccus | + | ++++ | ++++ | — | — | — | — |
| 17 | Coccus | + | ++++ | ++++ | — | — | — | — |
| 18 | Coccus | + | ++++ | ++++ | — | — | — | — |
| 19 | Coccus | + | ++++ | ++++ | — | — | — | — |
| 20 | *E. communior* | + | ++++ | ++++ | — | + | ± | ++ |
| 23 | *E. coli* | — | ++++ | ++++ | — | + | — | + |
| 24 | *E. coli* | — | ++++ | ++++ | — | — | — | + |
| 26 | *E. communior* | + | ++++ | ++++ | + | + | + | ++ |
| 27 | Bacillus | + | ++++ | ++++ | — | — | — | — |
| 29 | *E. coli* | — | ++++ | ++++ | + | ++ | ++ | +++ |
| 30 | *E. coli* | — | ++++ | ++++ | + | ++ | ± | ++ |
| 31 | *E. coli* | — | ++++ | ++++ | ± | + | + | ++ |
| 32 | *E. coli* | — | ++++ | ++++ | + | ++ | ++ | +++ |
| 33 | Coccus | + | ++++ | ++++ | — | — | — | — |
| 34 | Bacillus | + | ++++ | ++++ | — | — | — | — |
| 36 | Bacillus | + | ++++ | ++++ | — | — | — | — |
| 37 | Bacillus | + | ++++ | ++++ | — | — | — | — |
| 38 | Bacillus | + | ++++ | ++++ | — | — | — | — |
| 39 | Bacillus | + | ++++ | ++++ | — | — | — | — |
| 40 | Bacillus | + | ++++ | ++++ | — | — | — | — |
| 41 | *E. coli* | — | ++++ | ++++ | ± | + | ++ | +++ |
| 43 | Bacillus | + | ++++ | | — | — | — | — |
| 44 | Bacillus | + | ++++ | | — | — | — | — |
| 45 | Bacillus | + | ++++ | | — | — | — | — |
| 46 | *E. coli* | — | ++++ | | ± | — | ± | +++ |
| 47 | *E. communior* | — | ++++ | | ± | + | + | +++ |
| 48 | *E. coli* | — | ++++ | | ± | — | ± | +++ |
| 887 | *S. pullorum* | — | ++++ | ++++ | ++++ | ++++ | ++++ | ++++ |
| 570 | *S. pullorum* | — | ++++ | ++++ | ++++ | ++++ | ++++ | ++++ |

++++ = abundant growth.
+++, ++, + = intermediate amount of growth.
± = very scanty growth.
— = no growth.

A new series of experiments was undertaken, using four dyes of different sources. Dye A was purchased from the National Aniline & Chemical Co., dye B from G. Gruber & Co., dye C from Coleman and Bell Co., and dye D from the Pure Products Co. Dye A was certified by the Society of American Bacteriologists. Dye D was used in all of the previous work presented in this paper. This dye was manufactured previous to the war.

### Results of Tests of Dyes from Different Sources

It will be noted (table II) that dye A, a dye certified by the Society of American Bacteriologists, gives complete inhibition

Table II—*Action of brilliant green obtained from various manufacturers on organism isolated from chickens*

| Cult. | Organism | Dye A Nat'l Anilin | Dye B Gruber | Dye C Coleman & Bell | Dye D Pure Products | Control |
|---|---|---|---|---|---|---|
| 8 | *E. communior* | — | — | — | — | ++++ |
| 12 | *E. communior* | — | — | — | — | ++++ |
| 13 | *E. communior* | — | — | — | — | ++++ |
| 20 | *E. communior* | — | — | — | — | ++++ |
| 23 | *E. coli* | — | — | — | — | ++++ |
| 24 | *E. coli* | — | — | — | — | ++++ |
| 26 | *E. communior* | — | + | + | + | ++++ |
| 29 | *E. coli* | — | + | + | + | ++++ |
| 30 | *E. coli* | — | + | + | + | ++++ |
| 31 | *E. coli* | — | + | + | ++ | ++++ |
| 32 | *E. coli* | — | + | + | ++ | ++++ |
| 41 | *E. coli* | — | — | ± | ++ | ++++ |
| 46 | *E. coli* | — | — | — | ± | ++++ |
| 47 | *E. communior* | — | — | — | + | ++++ |
| 48 | *E. coli* | — | — | ± | ± | ++++ |
| 887 | *S. pullorum* | ++++ | ++++ | ++++ | ++++ | ++++ |
| 570 | *S. pullorum* | ++++ | ++++ | ++++ | ++++ | ++++ |
| 550 | *S. gallinarium* | ++++ | ++++ | ++++ | ++++ | ++++ |
| 555 | *S. gallinarium* | ++++ | ++++ | ++++ | ++++ | ++++ |

++++ = abundant growth.
+++, ++, + = intermediate amount of growth.
± = very scanty growth.
— = no growth.

of *Escherichia coli* in a dilution of 1 to 75,000, whereas the German dye (B) and the two other American dyes (C and D) allow small amounts of *Escherichia coli* to develop. Dye D, the one used in the work previously cited in this paper, was the poorest dye of the four examined.

A series of tests was made upon colon organisms isolated from water supplies. *Escherichia coli* was inhibited by all three of the dyes tested. *Aerobacter aerogenes* grew to nearly the same degree on the brilliant-green medium as upon the plain liver-agar These results confirm previous work by Rakieten and Rettger.

The best reaction for optimum bacteriostatic effect of the brilliant green was determined. Rakieten and Rettger claim that the reaction of the medium plays an important role in the activity of brilliant green when used in an enrichment medium. They found that the dye was active in an acid medium, but practically inert in an alkaline medium. They did not determine the effect of reaction upon a solid medium. To do this, a batch of liver-infusion agar was divided into three parts. These three portions were adjusted to different reactions, namely pH 6.6, 7 and 7.6. Brilliant green "D" was selected for use, as it allows a slight

TABLE III—*Effect of reaction of medium upon brilliant-green (1-75,000) liver-agar*

| CULT. | ORGANISM | pH 7.6 | | pH 7 | | pH 6.6 | |
|---|---|---|---|---|---|---|---|
| | | BRILLIANT GREEN | CONTROL | BRILLIANT GREEN | CONTROL | BRILLIANT GREEN | CONTROL |
| 8 | *E. communior* | ± | ++++ | — | ++++ | ± | ++++ |
| 12 | *E. communior* | ± | ++++ | — | ++++ | — | ++++ |
| 13 | *E. communior* | ± | ++++ | — | ++++ | ± | ++++ |
| 20 | *E. communior* | ± | ++++ | — | ++++ | ± | ++++ |
| 23 | *E. coli* | ± | ++++ | — | ++++ | — | ++++ |
| 24 | *E. coli* | — | ++++ | — | ++++ | — | ++++ |
| 26 | *E. communior* | + | ++++ | + | ++++ | + | ++++ |
| 29 | *E. coli* | ++ | ++++ | + | ++++ | ++ | ++++ |
| 30 | *E. coli* | ++ | ++++ | + | ++++ | ± | ++++ |
| 31 | *E. coli* | ++ | ++++ | ++ | ++++ | + | ++++ |
| 32 | *E. coli* | ++ | ++++ | ++ | ++++ | ++ | ++++ |
| 41 | *E. coli* | + | ++++ | ++ | ++++ | ++ | ++++ |
| 46 | *E. coli* | ± | ++++ | ± | ++++ | ± | ++++ |
| 47 | *E. communior* | ± | ++++ | + | ++++ | + | ++++ |
| 48 | *E. coli* | ± | ++++ | ± | ++++ | ++++ | ++++ |
| 570 | *S. pullorum* | ++++ ++++ | ++++ | ++++ | ++++ | ± | ++++ |
| 887 | *S. pullorum* | ++++ | ++++ | ++++ | ++++ | ++++ | ++++ |

++++ = abundant growth.
+++, ++, + = intermediate amount of growth.
± = very scanty growth.
— = no growth.

growth of *Escherichia coli*. Any effect of reaction of media would be readily discerned by the differences in amount of growth produced. A 1-to-75,000 dilution of the dye was used as in previous experiments.

The reaction of the medium (table III) has only a slight effect upon the inhibitory action of the brilliant green at the reactions tested. The best results were obtained at pH 7, but the difference is not marked. It would seem that on a solid medium, at least, where the organisms are smeared over the

surface of the medium, the reaction of the medium would have little, if any, significance.

During the course of the study presented, it was observed that the brilliant-green solution showed a decline in bacteriostatic power after the solution was a month or more old. This is illustrated by the following data: A freshly prepared solution inhibited the development of *Escherichia coli* in a dilution of 1 to 150,000, while a solution a month old inhibited only in a dilution of 1 to 50,000. The necessity of fresh stock solutions is clearly demonstrated.

## Discussion

A selective medium for the isolation of *Salmonella pullorum* is presented. This medium inhibits the development of Gram-positive bacteria and *Escherichia coli* without any appreciable inhibition of *Salmonella pullorum* and other avian members of the paratyphoid group.

Although liver-agar is recommended for use with the brilliant green, any other agar base will serve equally well. Liver-agar was selected, because of the enhanced growth that results. Any medium used should have a reaction of pH 7, since at this titre the dye appears to be at its optimum bacteriostatic power.

The dye used should be standardized as to the dilution that gives maximum selective action without any appreciable inhibition to the paratyphoid organisms. A dilution of 1 to 75,000 generally gives the best results, although in all instances dilutions of 1 to 50,000 to 1 to 200,000 should be tested. The highest dilution giving optimum relative properties should be selected for use.

A stock solution of the dye should be prepared at least once a month and stored in the ice-chest. Brilliant green loses its bacteriostatic properties upon standing in solution. The cause of this deterioration is not known.

## Conclusions

Brilliant green, when added to nutrient agar, allowed unrestricted growth of *Salmonella pullorum*, *Salmonella gallinarium* and all other members of the paratyphoid group.

Brilliant green had a selective inhibitory effect upon *Escherichia coli*, as previously pointed out by Torrey.

Brilliant green inhibited the growth of Gram-positive organisms found as contaminants in the usual autopsy plates.

A brilliant-green liver-infusion agar is recommended for the isolation of *Salmonella pullorum* and allied organisms from tissues of autopsied chickens, particularly baby chicks.

Brilliant green was the only dye of those tested that exhibited selective bacteriostatic action among the colon-typhoid intermediates.

The bacteriostatic effect of brilliant green obtained from various manufacturers gave decided variations.

Stock solutions of brilliant green deteriorated, upon aging, in their bacteriostatic effect. Fresh solution or one not more than four weeks old should be used.

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[4]Winslow and Dolloff: Jour. Inf. Dis., xxxi (1922), p. 303.
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## BANQUET IN HONOR OF DR. JAMES FLEMING

On September 7, 1928, the employes of the U. S. Bureau of Animal Industry tendered a banquet to Dr. James Fleming, who had been inspector-in-charge of federal meat inspection at Kansas City since 1910. The "fill" was served in the Aztec Room of the Hotel President. Dr. Fleming had been ordered to report at Clifton, N. J., to take charge of the United States quarantine station at that point, effective September 15. A large percentage of the meat inspection and virus-serum control forces of Kansas City were present with representatives of the other activities of the Department of Agriculture at Kansas City. Bureau employes from Topeka, Kansas; St. Joseph, Missouri, and other places also attended. The large attendance, good fellowship and speeches of appreciation and commendation of Dr. Fleming testified to the high esteem in which he is held by all of his associates.

According to a copy of the banquet program, kindly forwarded by Dr. Jos. W. Parker, Dr. G. E. Maxwell officiated in the capacity of "yarder" and called upon the following for after-dinner speeches:

"Anaphylaxis," Dr. J. B. Thompson.
"In Sweet Pickle," Mr. A. C. Stadler.
"Graphite Grindings," Mr. S. M. Miller.
"Concentrated Serum," Dr. F. A. Imler.
"The Big Squall," Mr. P. Connor.
"L'Envoi," Dr. N. L. Townsend.

# THE ACCURACY OF THE AGGLUTINATION TEST IN THE DIAGNOSIS OF BACILLARY WHITE DIARRHEA*

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Practically every one of the serological tests which have been widely used in the diagnosis of human and animal diseases has met criticism at the hands of certain investigators. Recently these criticisms have been based upon data collected by sending portions of samples of serum to several laboratories for diagnosis. The results of these procedures have not always been encouraging. Among the diagnostic tests which have been subjected to such analysis are the Wasserman reaction and the agglutination test for the detection of bovine infectious abortion. Gilbert and Langworthy[1] reported upon a number of samples of serum sent to different laboratories to be tested for syphilis. The results of these tests were quite variable, only 66 per cent correlation being obtained. The agglutination test for bovine infectious abortion has met severe criticism from various workers. Yet today these two serological tests are accepted as being of great value in the detection of disease and their application for the determination of infection is very widely practiced.

During the past year Beach and Merrick[2] published the results obtained by sending samples of chicken serum to six laboratories to be tested for bacillary white diarrhea. The results of this comparison were far from encouraging. The sera of 38 hens were sent to the six laboratories. In only five samples were the reports identical. Other similar tests reported by the same investigators agreed no more closely than the above.

The purpose of the present paper is to give the results of tests conducted in a manner similar to those of Beach and Merrick. The tests were carried out as follows: Twenty-four hens which were being used in experimental work were bled from the wing vein, the blood placed in the ice-box over night and the serum drawn off the following morning. The sera were divided into eight equal parts. Seven portions of each serum were placed in

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small bottles and preserved by the addition of crystals of thymol. The eighth portion was used to set up agglutination tests in this laboratory. One portion of each of the preserved sera was sent to the following investigators: Dr. H. J. Stafseth, Dr. L. F. Rettger, Dr. F. R. Beaudette, Dr. W. R. Hinshaw, Dr. M. Scherago, Dr. A. J. Steiner and Dr. Frank Hare. Each of these workers subjected the sera to the agglutination test for bacillary white diarrhea.

TABLE I—*Results of agglutination tests of same sera by different laboratories*

| Bird No. | Laboratory Number | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| H49 | — | — | — | — | — | — | | — |
| H62 | — | — | — | tr | — | — | | — |
| H71 | — | — | — | — | — | — | | — |
| 44 | + | + | + | + | + | + | + | + |
| F100 | + | + | + | + | + | + | | + |
| H293 | + | + | + | + | + | + | + | + |
| H310 | + | + | + | + | + | + | + | + |
| H413 | + | + | + | + | + | + | + | + |
| H416 | + | + | + | + | + | + | + | + |
| H421 | + | + | + | + | + | + | + | + |
| H454 | + | + | + | + | + | + | + | + |
| H472 | + | + | + | + | + | + | | + |
| H479 | + | + | + | + | + | + | + | + |
| H484 | + | + | + | + | + | + | + | + |
| H488 | + | + | + | + | + | + | — | + |
| H489 | ± | + | + | + | + | + | | + |
| H505 | + | — | + | + | + | + | + | + |
| H626 | + | + | + | + | + | + | | + |
| J997 | ± | + | + | + | + | + | | + |
| 2471 | + | + | + | + | + | + | + | + |
| 2491 | — | + | + | + | + | — | | + |
| 2495 | + | + | + | + | + | + | + | + |
| A5903 | + | + | + | + | + | + | | + |
| A5952 | — | — | — | ± | — | — | | ± |

tr = Trace of an atypical reaction.
± = Partial reaction.

The results of these tests, which are given in table I, are very uniform. Laboratory 1 reported one sample as negative which the majority of the workers reported positive. Laboratory 2 also reported one sample negative which the majority found positive. Laboratory 3 and Laboratory 5 agreed with the majority report in every instance. Laboratory 4 reported one sample as a partial reactor which the majority of the workers reported negative. The same laboratory reported an atypical trace of reaction in a sample which the majority reported negative. Laboratory 6 reported one sample negative which the

majority of workers reported positive. This sample (2491) was the same as that reported negative by Laboratory 1. Laboratory 7 tested only fourteen samples of the serum, finding ten samples unfit to test. This laboratory reported one sample negative which the majority reported positive. Laboratory 8 reported one sample as a partial reactor which the majority of the workers found negative. If the majority report be taken as correct in each instance the agreement of the eight laboratories for the twenty-four samples is 96.1 per cent.

In justice to the investigators taking part in this work, it should be stated that the samples were not in the best of condition when shipped. The addition of thymol caused, in some instances, a heavy white precipitate, which made the tests very difficult to read. In every case in which a laboratory reported a bird negative while the majority report was positive, that sample of serum was markedly cloudy so that a perfectly satisfactory reading could not be obtained.

In addition to the difficulties cited above, there is still another factor which must be considered in work of this kind. The agglutinins in fowl serum acting upon *Bact. pullorum* are not nearly so active after preservatives are added to the serum. Our tests of serum which has been preserved, shipped to distant points and returned to this laboratory have demonstrated this fact. So that when we consider the effect of preservation upon the agglutinins for *Bact. pullorum*, it may be easily understood why discrepancies appear in such comparisons. There is no doubt whatever that could the workers taking part in this study have tested these samples of serum when fresh and unpreserved, the results would have been even still better. The difficulties under which they were working are shown by the fact that one laboratory found ten of the samples in such bad condition that they could not be tested. The samples received by the other investigators also were in poor condition for testing.

It has been demonstrated by the writers[3] and by numerous other investigators that hens reacting to the agglutination test are carriers of *Bact. pullorum*. Therefore, it is the writers' opinion that these results demonstrate that the agglutination test for the detection of bacillary white diarrhea is an accurate method of diagnosis. It is extremely unfortunate that the work of Beach and Merrick[2] has been given wide publicity by certain commercial hatcheries and other persons who are seemingly

interested in discrediting the agglutination test. In this test we have a specific method for the determination of infection in breeding stock. A great mass of data has accumulated through the work of a large number of investigators during the past fifteen years. The work of these men has demonstrated that by careful application of the agglutination test, baby-chick losses from this infection can be controlled and the disease finally eradicated from breeding flocks. Again we say that it is extremely unfortunate that one piece of work, the results of which were anything but uniform, should have been taken as being representative of the accuracy of the agglutination test when there are innumerable instances of previous work, all tending to show that the agglutination test is an unusually accurate method of diagnosing bacillary white diarrhea. The erroneous conclusions drawn from the work of Beach and Merrick by the commercial poultrymen will tend to delay the eradication of one of the most destructive diseases with which the poultryman must cope.

The agglutination test has placed in the hands of the poultry disease investigator a means of controlling bacillary white diarrhea. It is the commercial hatchery which is distributing diseased chicks and which is unwilling to incur the trouble and expense of testing, that would have the farmer believe that the control of the disease by the blood test is impractical. Commercial hatcheries have increased in number until the traffic in baby chicks is enormous, yet no regulations have been generally adopted to prevent the spread of disease by these agencies. The distribution of baby chicks has become the chief source of the spread of bacillary white diarrhea. No other live stock industry enjoys the freedom from regulatory measures that is possessed by the commercial hatcheries. Yet many hatchery operators endeavor to impress upon their customers that the agglutination test is worthless in the prevention of bacillary white diarrhea, and its application a detriment rather than a benefit.

It is to be hoped that the buyer of baby chicks may be brought to the realization that his losses may be materially reduced through careful and systematic application of the agglutination test. Then the buying public will demand chicks from stock which have been tested by a competent operator and the

control and eradication of the disease will go forward at a much faster rate.

In conclusion the writers wish to thank the investigators who collaborated in this work, and made the comparative tests possible.

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## WHEN DISASTER RIDES THE SKIES

The poster which Chapters of the American Red Cross will display throughout the country from November 11 to 29, inviting the people to join the Red Cross for another year, symbolizes the services of relief and rehabilitation provided by the "Greatest Mother" when disaster strikes. Throughout the past year the Red Cross has been engaged continually in disaster relief work at home and has extended assistance in many catastrophes abroad. The poster reproduced in the advertising section of this issue of the JOURNAL, was painted by Cornelius Hicks.

THE A. V. M. A. CLINIC AT UNIVERSITY FARM
A view of the large-animal clinic.

# COMPARISON OF TUBE AND SLIDE AGGLUTINATION TESTS FOR BACILLARY WHITE DIARRHEA*

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## INTRODUCTION

The agglutination test for bacillary white diarrhea has come into very wide use during the past two years as a means of detecting infected birds. The tube method has been used almost exclusively until the past year and has given excellent results, as indicated by reports from many parts of the country. That it has occasionally led to false conclusions is also evident from numerous reports in the literature. The very fact that there is frequently a discrepancy in the reports upon the same material tested by this method from different laboratories leads to considerable doubt that such a test will ever come into general use and be free from serious criticism. For this reason a test not open to so much criticism should be sought.

In this laboratory we have been making a comparison of the various methods which have been recommended for this test. After several months of rather intensive study we are making this short report on the results obtained by comparing the tube agglutination test and the rapid slide-test.

Huddleson and Carlson[1] have modified the agglutination technic for infectious abortion in cattle by introducing a rapid slide method. They used an antigen which was very concentrated and which contained 12 per cent sodium cholrid (c. p.) and 0.5 per cent phenol.

Runnells, Coon, Farley and Thorp[2] developed a rapid method of testing fowl blood based on the technic of Huddleson and Carlson. This consisted in using an antigen about 50 times as concentrated as that used in the tube-test and containing 12 per cent sodium chlorid. To 0.02 cc of this concentrated antigen they added 0.01 and 0.02 cc of serum. The mixtures were warmed gently and agitated for a few minutes. In the presence of positive sera there was a rapid and complete agglutination of the antigen.

There are several advantages to this method. It requires less equipment and gives immediate results. It also avoids the trouble from contamination which has been described by Hin-

*Contribution No. 105, Department of Bacteriology, Kansas Agricultural Experiment Station. Received for publication, May 2, 1928.

shaw and Dunlap[8] and which we believe has been one source of the differences reported on the same sample of serum by different laboratories.

### Preparation of the Antigen

One of the most important and also the most difficult parts of the technic of this test is the preparation of a suitable antigen. The cultures used were all typical of the organism and kept in vigorous growing condition by frequent transfer to fresh media. These were frequently tested for purity and ability to undergo agglutination by known positive sera. None of the cultures used showed spontaneous agglutination.

The antigens used by us were prepared by growing the organism on beef-extract agar prepared by using Difco standardized peptone and 0.2 per cent sodium citrate and adjusting the reaction to pH 7.0. The organisms were grown for about 24 hours at 37° C., suspended in physiological salt solution and washed twice. The sediment was then suspended in a sufficient amount of 12 per cent sodium chlorid solution to make the resulting antigen 50 times as concentrated as that used in the tube method. At first we used only freshly prepared antigen to which no phenol was added. Later antigens containing 0.5 per cent phenol were used but the results were not always so good as when fresh antigens were used.

### Method of Conducting Tests

The technic of the test is similar to that used by Runnells et al, except that we have used a single dilution of about 1:25. It consists of placing two drops of clear serum of uniform size on various ruled areas of a glass plate and adding to these a drop of concentrated antigen of equal size. The plate is warmed gently and tilted from side to side to mix the serum and antigen. The ingredients may be stirred together but this is not necessary. The readings are always taken within three minutes, and preferably within two minutes after adding the antigen to the serum. If the mixing is continued too long there are some tests which show a slight clumping. In such instances the reading may not agree with the tube-test while those read within three minutes agree very well.

There are very few borderline reactions if the antigen is correctly prepared and the incubation of the test is not too long. We have found occasional samples of serum which do not give

a reaction to the rapid method but which react in the tube-test. Retests on many of these samples gave the same results. This is a point which cannot be fully explained but is due apparently to some peculiarity of the concentrated antigen which delays the reaction.

## Results Obtained

Up to the present time we have compared 5029 tests by using the tube method as standard and exercising great care to avoid growth of organisms in the tests. This has been accomplished during part of the work by incubating the tests at 45° C. in the absence of phenol.

Of the tests made, 978 (19.2%) were reactors by the tube method. Comparing the results by the Yule method there is found to be an association coefficient of .099+. The results are recorded in the following summary:

| | *Number* | *%* |
|---|---|---|
| Positive to tube and positive to rapid..... | 891 | 17.7 |
| Negative to tube and negative to rapid... | 2956 | 78.7 |
| Positive to tube and negative to rapid.... | 87 | 1.7 |
| Negative to tube and positive to rapid.... | 95 | 1.9 |

Association coefficient—0.99+.

An association coefficient of 0.99 is very high. In only 3.6 per cent of the tests was there a disagreement. This disagreement was due to the fact that 87 of the tests which were positive to the tube method were negative to the slide method. There were also 95 tests positive to the slide method which were negative to the tube method. In many cases these tests were repeated the next day with similar results. This leads to the belief that these differences are not due to avoidable technical difficulties, but to differences in actual reaction.

The significance of these differences is not known. In numerous cases we have found, as others have reported, that some reactors show no visible lesions of the disease while in some cases the organism may be isolated from birds which do not react to the test.

However, we have considerable statistical evidence in our files which indicates that culling reactors to the tube agglutination test over a period of years will finally eradicate the disease from a flock. If this is the case the data submitted indicate that the

rapid method of detecting reactors should be equally as effective as the tube method.

SUMMARY

We may summarize our findings by saying that the rapid slide-test, using concentrated antigen and a short incubation period, may replace the tube agglutination test for detecting carriers of bacillary white diarrhea. A freshly prepared antigen has given much better results than one which has been kept for several days even in the ice-box. The dilution should be retained at 1 to 25, as has been recommended for the tube-test.

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[3]Hinshaw, W. R., & Dunlap, G. L.: Atypical *Salmonella pullorum* agglutination caused by bacterial contamination. Jour. A. V. M. A., lxii (1928), n. s. 25 (5), pp. 594-598.

## CONVENTION NOTES

State veterinarians were in plentiful supply. Among those present were: Cary, of Alabama; Bux, of Arkansas; Knapp, of Florida; Brown, of Indiana; Malcolm, of Iowa; Killham, of Michigan; Cotton, of Minnesota; Rafnel, of Mississippi; Hays, of Nebraska; Moore, of North Carolina; Crewe, of North Dakota; Lytle, of Oregon; Munce, of Pennsylvania; Ray, of South Dakota; Lincoln, of Tennessee; Williams, of Texas; Givens, of Virginia, and Case, of Hawaii.

Six members were present from the District of Columbia representing various branches of the government service. These included Dr. J. R. Mohler, Chief of the Bureau of Animal Industry; Dr. A. E. Wight, Chief of the Tuberculosis Eradication Division of the B. A. I.; Dr. E. W. Price, of the Zoological Division of the B. A. I.; Dr. H. E. Moskey, of the Food, Drug and Insecticide Administration; Dr. J. E. Shillinger, of the Bureau of Biological Survey, and Major R. A. Kelser, of the Veterinary Corps of the Army.

Ohio veterinarians turned out in force. Those present included: Drs. H. E. Ash, Bowling Green; W. A. Axby, Harrison; C. H. Case, Akron; H. H. Fairbank, Leonard W. Goss, J. D. Grossman, W. H. McKenzie, D. M. Swinehart and D. S. White, of Columbus; C. A. Fast, Van Wert; C. W. Fogle, Leipsic; Reuben Hilty, Toledo; E. V. Hover, Lima; A. J. Kline, Wauseon; J. H. Lenfestey, Lyons; George Place, St. Marys; R. S. Smiley, Cromers, and E. Ziegenbusch, Delphos.

# STUDIES ON A GROSS NO-LESION TUBERCULIN REACTOR

*By* H. E. Biester *and* Chas. Murray

*Veterinary Investigation Department, Ames, Iowa*

The problem of no-lesion reactors in cattle is one which is of considerable interest from the standpoint of pathology, meat inspection and tuberculosis eradication. The following case is deemed worthy of record because of the obscurity of the early lesions, no tubercles being visible after a careful gross examination. Animal inoculation of suspected material from the subject also gave negative results.

An Angus bull calf was purchased with the intention of feeding and preparing it for the show-ring as a steer. Two tuberculin tests and a 60-day quarantine are required for admission to the herd to which it was to be added. On November 11, 1926, the first tuberculin test (intradermal) was negative, after which the animal was castrated and placed in quarantine. On January 10, 1927, at the end of the 60-day quarantine period, the steer reacted to the second tuberculin test and was slaughtered under local inspection on January 19, nine days after reacting. At this time the subject was ten months old and weighed 423 pounds.

A detailed meat inspection was performed. The hide was carefully examined and the cadaver was minutely inspected. After its division into the various cuts, further examination was made. A composite sample of some of the deeper lymph-nodes was injected into guinea pigs and rabbits with negative results. The only gross alterations noted were two moderately enlarged, reddened mesenteric lymph-nodes in the jejunal region. These two nodes were freely incised. They presented a congestion with minute hemorrhages. No gross tubercles nor necrosis were found after numerous closely placed incisions with critical examination under a strong light.

The internal organs were ribboned and subjected to careful autopsy technic, but gross lesions were not found. The reddened jejunal mesenteric lymph-nodes referred to above were divided into two nearly equal parts, one portion for animal inoculation and the other for embedding and histopathologic study. This was done by taking alternate sections for each purpose. The one portion was placed in a refrigerator overnight and the follow-

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ing day was ground up in a mortar and injected into two guinea pigs and two chickens. The other half was fixed in formalin and embedded in paraffin.

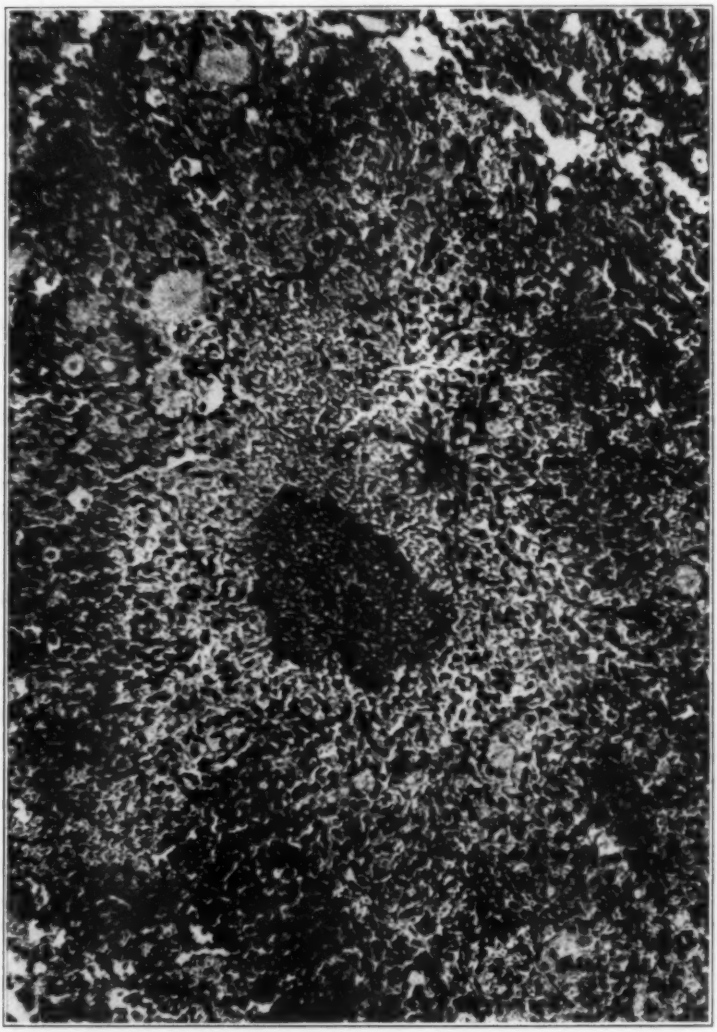

FIG. 1. Mesenteric lymph-node from steer, showing tubercle. x 200.

Scrapings from cut surfaces for direct microscopic examination were taken after the incisions and gross observations were made. A complete search of the first six large direct smears showed no acid-fast bacilli. The following two direct smears contained

acid-fast bacilli although no lesions other than hyperemia were discernible on any of the surfaces from which scrapings for smears were taken. The injected guinea pigs were allowed to live about four months after injection of the suspected material. They did not lose weight nor show lesions at autopsy. One chicken succumbed during an outbreak of tracheitis, before the lapse of sufficient time for the possible development of lesions. The other chicken was destroyed sixty-eight days after injection of the lymph-node material but no lesions were present.

Microscopic sections were made of a number of embedded blocks from the lymph-nodes of the steer, resulting in no unusual observations. However, on cutting one block, a very fine, pin-point area on the ribbon drew attention. Microtome sectioning was continued and the focus of different texture increased slightly in size, after which two almost invisible foci appeared. This block was cut to its base but no further foci appeared after these had been passed. Stained by routine hematoxylin and eosin method, these minute areas were found to be tubercles showing early caseation, karyorrhexis, epithelioid-cell infiltration, congestion and giant cells present. The largest lesion (fig. 1) was about one-third millimeter in diameter, as determined from a x200 photomicrograph. That part of the lesion which was visible grossly seemed smaller.

The same histologic section also contained large areas of epithelioid cells, congestion and small pools of red blood-cells (fig. 2), similar to the areas adjacent to the tubercles. Other blocks showed similar cellular proliferation, congestion and extravascular blood, but no microscopic tubercles. Histologic sections five and six micra thick were stained by the acid-fast method. Numerous acid-fast organisms were found in the three minute tubercles described (fig. 3). In section the organisms appeared short and plump. Acid-fast organisms as demonstrated in the histologic sections were confined to the three tubercles. As the edges of the tubercles were reached in the serial sections no bacilli were found. A careful search of all other sections from different embedded blocks revealed no organisms in any of the areas of epithelioid-cell reaction, congestion and extravascular blood.

The demonstration of organisms in tissues by direct microscopic search, while a highly technical procedure, is in reality a crude diagnostic armamentarium when it is considered how infinitesimally small a part of the material being examined can

be seen in each field of the microscope. Diagnosis of tuberculosis by animal inoculation is generally considered the final and most dependable method, especially when other methods have proven

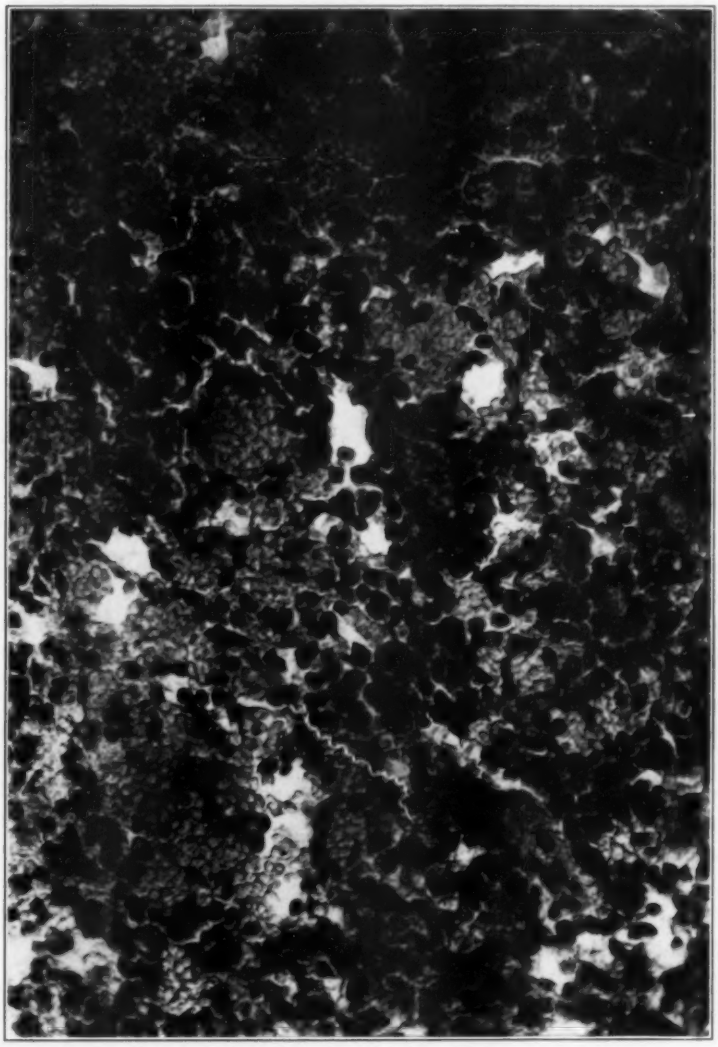

FIG. 2. Mesenteric lymph-node from steer, showing focal hemorrhage and some epithelioid cells, with absence of acid-fast organisms in such areas. x 450.

insufficient. However, in this instance the direct microscopic method prevailed over the more generally accepted injection method.

Failure to demonstrate tubercle bacilli by inoculation tests has been explained in some cases by an apparent lack of virulence for the test animals, death of the organisms in lesions that are healing and by absence of organisms from the material used for injection or presence in such numbers as not to be infectious. The lesions under consideration were active and gave no indications of healing. Therefore, it can be assumed that we were not dealing with dead bacilli. Some of the other factors cannot be ruled out, but the histologic study seems to indicate that possibly the acid-fast organisms were confined to a rather small area, which happened to be selected only with the material for microscopic study. If bacilli were present in other portions of the lymph-nodes, their numbers were too small for demonstration by any method.

A consideration of experimental lesions would suggest that those described in this report were of not less than thirty days' duration. When tubercle bacilli become lodged in tissues, a microscopic reaction between bacilli and the cellular elements results, involving chiefly the leucocytic cell types. Medlar[1,2] experimentally traced the body responses to the intravenous introduction of tubercle bacilli. Ten days after such inoculation not even microscopic tubercles had formed in the spleen. A careful microscopic study may show single tubercle bacilli or groups of two or three bacilli in the Malpighian corpuscles. The bacilli were usually within leucocytes but some seemed to be extracellular. In his fifteen- and twenty-day specimens the reaction consisted almost entirely of mononuclear leucocytes. He refers to this change as the mononuclear of "epithelioid" tubercle. No caseation is present. At twenty-five days, after introduction of the organism, the presence of polymorphonuclear leucocytes becomes marked. The process of caseation does not take place until the polymorphonuclear infiltration has advanced. In the reported case the process of caseation was present, although it had not yet advanced to the center of the largest of the three minute tubercles found.

Experimental work[3] has shown that cutaneous hypersensitization may appear the seventh or eighth day after the injection of bacterial filtrates. When this fact is borne in mind in considering the nature and development of the tuberculous lesion, it can readily be seen that we are dealing with a change that may prove difficult or impossible of demonstration, especially if attention is not directed to an individual node or area, thus necessitating

a search extending throughout a subject usually weighing five hundred pounds or more. Where a large number of animals are inspected it would not be feasible to devote unlimited time to each subject in a search for organisms. Nearly three hours were consumed in searching the direct smears, while the histologic studies required more than that number of days. If the scrapings had been taken from other places, even with this expenditure of time the bacilli might have been overlooked.

The difficulties encountered in demonstrating lesions and organisms would no doubt have been greatly increased if the

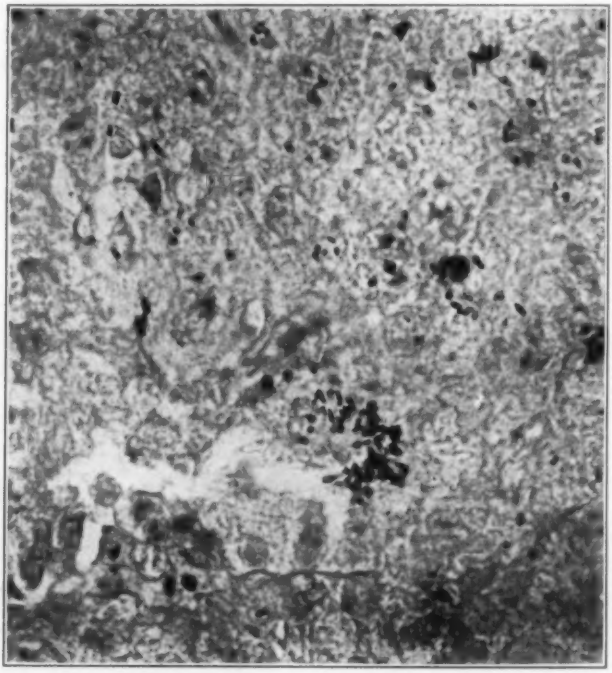

FIG. 3. Mesenteric lymph-node from steer, showing acid-fast organisms in tubercle. x 900.

second test had been performed three or four weeks earlier and the animal destroyed then, when changes were undoubtedly made up of reactions between a smaller number of bacteria and cells. It should also be noted that nine days had elapsed from the date of the positive tuberculin test to the time of slaughter and inspection, giving the process that much more time to progress. As exposure to the infection is lessened by the removal of reactors

at regular intervals, the resulting lesions would be on a smaller scale, which may account for an increase in the percentage of so-called no-lesion reactors. The classification of a case as a "no-lesion" reactor should carry with it the responsibility of having eliminated even so much as the cellular changes resulting from a reaction between a few cells and a few bacilli, if such a premise could be proved. In any event, when it is considered how soon after the introduction of the organisms cutaneous sensitization takes place, the term "no-lesion" reactor should not be construed too literally.

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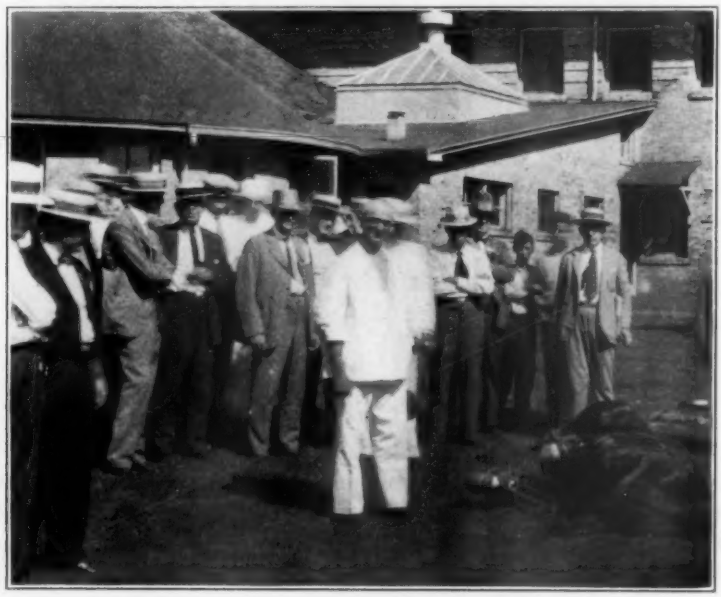
## BUREAU TRANSFERS

Dr. Geo. H. Starr (McK. '17) from Pottsville, Pa., to National Stock Yards, Ill., on meat inspection.

Dr. Orley J. Mayfield (Iowa '28) from Kansas City, Mo., to Indianapolis, Ind., on virus serum control.

Dr. J. A. Skordahl (St. Jos. '19) from Milwaukee, Wis., to Sioux City, Iowa, on meat inspection.



THE A. V. M. A. CLINIC AT UNIVERSITY FARM
Dr. "Tom" Sigler was a busy man.

# GASTRO-INTESTINAL PARASITES OF EQUINES AND CONTROL MEASURES*

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## INTRODUCTION

Horses probably harbor more species of parasites than any other domestic animal. In 1911 Gedoelst[1] recorded 224 species of zooparasites for the horse, 38 species for the ass, and 34 species for the mule. Many new species have been added to these lists since 1911 and it is probable that the number of species of animal parasites known from equines at the present time is close to 300. Animal parasites of equines include Protozoa, trematodes, cestodes, nematodes and arthropods, and are reported from various locations on and in the body, including various parts of the skin, subcutaneous tissue, musculature, tendons and ligaments, frontal sinus, mouth and pharynx, esophagus, stomach, small intestine, large intestine, liver, peritoneum, nasal cavities, bronchi, lungs, arteries, blood, kidneys, testes, brain, eye and other organs and tissues.

Over 100 species of worm parasites have been reported from horses and of these the vast majority occur in the digestive tract. While in certain parts of the world, especially in the tropics, trypanosomes overshadow in importance all other equine parasites, in the United States and in practically all other temperate regions the parasites which occur in the gastro-intestinal tract of these animals demand first consideration. With a few exceptions, the parasites of the gastro-intestinal tract have a direct life history, this factor commonly tending to produce gross infestations with resultant disturbances in digestion, irritation and inflammation of the mucosa of the alimentary canal, anemia due to the abstraction of blood by blood-sucking species and also, probably, to secondary causes, and other pathological conditions commonly associated with the gross invasion of the alimentary canal by parasites.

For the sake of convenience gastro-intestinal parasites of horses may be grouped in accordance with their position in the alimentary canal as follows: (1) parasites of the stomach, includ-

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ing botfly larvae and stomach-inhabiting nematodes; (2) parasites of the small intestine, including certain tapeworms and the ascarids or large intestinal round worms; and (3) parasites of the large intestine, including the well-known blood worms (also known as red worms or palisade worms), the small strongyles, the pinworms and one tapeworm.

### Botfly Larvae

Three species of botflies, the maggots of which are parasitic in the stomach of equines, occur in the United States. These are briefly noted as follows:

The common botfly, *Gastrophilus intestinalis*, is the best known and most widely distributed species and occurs in practically all parts of this country. The parasitic larvae of this species are the largest bots which occur in equines and usually have a reddish color. They attach to the white covering of the left or non-glandular sac of the stomach or along the ridge between the right, or glandular, and left sac of the stomach. The adult of this maggot is the least annoying adult of the three species of botflies, as far as frightening horses is concerned, possibly because it deposits its eggs in the hairs of the legs.

The throat botfly or chin fly, *Gastrophilus nasalis*, is also widely distributed in the United States and is especially common in the Rocky Mountain region. The adult fly deposits its eggs principally under the jaw of the horse, often causing an animal to throw its head violently and sometimes to strike with its fore feet. The parasitic larvae of this species are usually yellowish and very much paler than the common bots mentioned above. They are found mainly attached to the pyloric end of the stomach or in the upper duodenum.

The nost fly, *Gastrophilus haemorrhoidalis*, has at the present time a limited distribution, being confined mostly to the North Central and certain of the Rocky Mountain States, but it appears to be spreading in all directions. The adult of this species deposits its eggs on the hairs on the edge of the lips and causes many runaways and much annoyance to horses, partly, perhaps, because of its egg-laying habit. This is the most dangerous of all the adult botflies and its spread over the country can be traced in the widening area in which fly-nets and other devices for protecting horses have come into use. The larvae of this species occur most commonly in the pyloric portion of the stomach and may also be found in the anterior portion of the duodenum.

The maggots of the common bot and of the nose bot are taken into the mouth but it has not as yet been shown whether they are swallowed or whether they get into the stomach in some other way. In the case of the throat bot, it has not as yet been definitely ascertained how the maggots get into the host animal. Once in the stomach, however, the maggots attach themselves to the mucosa and remain in that location for a period of from eight to twelve months or longer. The maggots of the common botfly and of the throat botfly remain attached to the wall of the stomach until they are ready to pass out of the body. Those of the nose botfly, after a period of development, let go their hold upon the wall of the stomach and the upper part of the small intestine and pass into the rectum where they reattach themselves, then they detach again and attach themselves, this time to the anus, and remain in this position for three or four days; and finally drop to the ground. This species may pass out at any time and is not normally expelled with the manure, whereas the other two species are expelled with the manure. Usually all fully developed bots have passed out of the stomach by October 1, those remaining during the winter being young forms.

There can be no question as to the injuriousness of bots. It is not uncommon to find several hundred bots in the stomach of a horse and as many as over one thousand bots have been recovered from the stomach of a colt. Bots are attached to the mucosa by means of large mouth-hooks and they bear spines on much of the body surface. The attachment of even a few bots must do some harm to the gastric mucosa, since the attachment produces small areas of inflammation. When many bots attach themselves at the same time a considerable degree of irritation results. The Germans reported a number of horses killed by bots as a result of gross infestations during the fighting along the Russian front in the late war. The attachment of the nose bots to the wall of the rectum and to the edge of the anus before they pass out is very annoying to horses and these animals have been known to dislocate bones in the tail in their attempts to obtain relief by rubbing the affected parts.

*Control measures:* The most important control measures which have been recommended for botflies include the use of repellents to protect horses from the adult flies, the use of protective mechanical devices to prevent the flies from depositing their eggs on horses, the destruction of the eggs on the horse, and medicinal treatment for the removal of bots from the stomach.

As far as concerns the use of fly repellents, Bishopp and Dove[2] report that a mixture of equal parts of pine tar and lard applied to the skin of the horse will keep botflies from laying their eggs on the treated parts for about four days after the application of this mixture. These writers also report that they obtained good results by applying to the hair a mixture consisting of pine tar, 3¾ ounces; kerosene, 1¼ ounces; powdered resin, 1 ounce; laundry soap, 1 ounce; and hot water, to make 14 ounces. The pine tar is thinned with the kerosene and the soap and resin are dissolved in hot water, the two mixtures being poured together. It is recommended that this mixture be applied with a brush. It should be remembered in this connection that repellents are at best merely palliatives, since the flies will deposit their eggs on untreated animals or on parts of treated animals to which the repellents have not been applied.

Various mechanical devices which cover the throat and lips, as well as other parts of the body, have been proposed and used, and these devices have their advantages in that they afford a certain degree of protection against flies and eliminate to some extent the maggots as internal parasites. They are, however, subject to the same limitations as repellents and are merely to be regarded as palliative measures.

Bishopp and Dove[2] report that a 2 per cent solution of any of the standard, coal-tar creosote dips applied with a rag to the hair will kill a high percentage of the eggs. According to these workers, a wash of 2 per cent carbolic acid applied to the surface and not rubbed in has also given good results in killing the eggs. In the case of the common botfly seven days elapse between the time that the eggs are deposited until they hatch, so that treatment for the destruction of the eggs must be carried out every six days throughout the egg-laying season.

*Medicinal treatment for the removal of bots from the stomach:* The animals should be fasted for 18 hours. For a horse weighing 1000 pounds, 6 fluid drams (25 cc) of carbon bisulphid should be administered by stomach-tube or in capsule. No purgatives should be used in connection with this treatment. Following the administration of carbon bisulphid the bots may continue to pass out for seventeen days. This treatment is approximately one hundred per cent effective. If there is any question as to the animal's ability to tolerate the dose given above, two doses of 4 drams each, with a two-hour interval between the doses, or three doses of 3 drams each, with an hour interval between the

doses, may be given. The single-dose treatment is the most effective and should be used in preference to the divided treatments when there are no contraindications. Yearling horses should be given half of the above doses. Food and water should be withheld for about three hours following the treatment.

Carbon tetrachlorid in doses of 6 to 12 fluid drams (25 to 50 cc) will remove approximately 25 per cent of the bots.

### Stomach Worms

Horses commonly harbor four species of stomach worms, of which three species are spirurids belonging to the genus *Habronema*. These nematodes have a more or less complex life history involving insects as intermediate hosts, whereas the remaining species of nematodes inhabiting the stomach of the horse is a trichostrongyle, having a direct life cycle with several free-living stages which are passed in the manure and on the pasture.

The life cycles of the three species of *Habronema* are essentially similar. The eggs develop within the female worm to a point where active embryos are produced, the embryo being enclosed in a flexible thin shell. The embryos pass out with the manure and are taken up by the secondary host which is a species of fly. In the case of two species of stomach worm, *H. muscae* and *H. megastoma*, the embryos enter the maggots of the ordinary house fly, *Musca domestica*, and related species of the genus *Musca* as they feed in manure. In the case of the other species, *H. microstoma*, the stable fly as well as the housefly is the intermediate host, the former being as a rule the preferred intermediate host. The young worms pass through three larval stages in flies, reaching the last stage of development shortly before or after the maggots become adult flies. At this stage the larvae are found in the head, frequently in the proboscis, but they also occur in the thorax and in the abdomen. When infected flies, either while still alive or not too long dead, are swallowed by horses or other equines, the larvae get into the stomach, where they develop to the adult stage. Another and perhaps more common method of infection is as follows: As flies feed on the moisture of the lips of horses the larvae which occur in the proboscis of the insects escape and are swallowed, the warmth and moisture of the lips stimulating the larvae to escape from the flies.

While *H. musca* and *H. microstoma* are of comparatively little importance as far as concerns their injury to the gastric mucosa,

though both of these species push their heads deeply into the mucosa, *H. megastoma* produces large tumors in the stomach, these tumors attaining the size of a hen's egg. The tumors occur between the mucosa and the muscular layers of the glandular portion of the stomach and are firm in texture, becoming hard and fibrous in the course of time. The tumors frequently contain pus and dead worms and probably also interfere with the function of the gastric mucosa. When the tumors are located near the pylorus they may interfere mechanically with the passage of food into the duodenum. These conditions, together with the absorption of pus, of dead and degenerated worms, and of necrotic material produce a clinical condition of malnutrition and digestive disturbance.

### Summer Sores and Other Pathological Conditions Associated with the Larvae of Habronema

A condition in horses reported from various parts of the world as a granular dermatitis, summer sores, habronemic granulomata, or cutaneous habronemiasis, is, according to the observations of various competent investigators, due to *Habronema* larvae, probably to the larvae of all three species, although the larvae of only two species, *H. muscae* and *H. megastoma*, have been definitely incriminated as causal agents of this skin disease. Summer sores due to *Habronema* larvae have been reported from the Belgian Congo, Brazil, France, Australia and other parts of the world. According to certain investigators, the larvae do not develop sores on the intact skin but can maintain themselves only in abrasions of the skin, on sites of operations, injury and irritation.

Summer sores in horses are characterized by the formation of ulcers containing caseous or calcareous granulations from the size of a grain of millet to that of a nut. The sores tend to disappear in winter, the prevalence of the disease being in a general way parallel with the prevalence of flies.

*Habronema* larvae have also been found in the eye in association with conjunctivitis for which they are believed to be responsible. They have also been reported from the lungs, occurring in this organ in grayish nodules of irregular shape, usually small, but sometimes as large as a nut or even larger.

There is no known medicinal treatment for these parasites at the present time, although carbon bisulphid and carbon tetrachlorid are probably promising drugs for the removal of these

worms. Prevention consists in the proper disposal of manure to prevent flies from breeding, and involves especially cleanliness of stables and yards.

The remaining species of nematodes occurring in the stomach of horses is a small slender thread-like worm, *Trichostrongylus axei*, which occurs embedded in tumors in the glandular portion of the gastric mucosa. So far as can be judged from its systematic position, this nematode has a simple and direct life history. Presumably it is as follows: The eggs which are eliminated with the feces hatch on the pasture and the larvae undergo two molts, emerging as infective larvae after the second molt; the infective larvae on the pasture are swallowed by the horse in feeding and on getting into the stomach the young worms settle down in this organ and develop to maturity.

The lesions produced by *T. axei* vary somewhat in appearance. Those occurring in the cardiac glandular region are more or less uniformly flattened elevations ranging in size from a few millimeters to about 5 cm. in diameter, are light in color and are covered with a thick layer of mucus. The lesions occurring in the fundus gland region are raised, umbilicated adenoma-like growths and are about 1 cm. in diameter. The mucous membrane may also show an irregular roughened appearance; sometimes small wart-like elevations or papillomata may be observed. In all cases in which lesions due to *T. axei* are present, the mucous membrane is covered by a thick layer of tenacious mucous.

There is no adequate information regardiug treatment for the removal of this parasite. Carbon bisulphid, carbon tetrachlorid, tetrachlorethylene and oil of chenopodium are worthy of trial and would probably kill worms not so embedded in mucus or the mucosa as to be out of reach.

The prophylactic measures against these worms are the same as those recommended in connection with strongyles of the large intestine and these measures will be discussed in connection with the latter worms.

### The Large Intestinal Roundworm of Horses

The large intestinal roundworm of horses, *Ascaris equorum*, is a dangerous parasite, especially when it occurs in large numbers, a condition which is by no means uncommon in colts. Reports of hundreds and even of several thousand worms in a single animal are on record. Deaths among horses have been attributed to these roundworms as a result of mechanical occlusion

of the intestine by a mass of worms, perforation of the intestinal wall with resultant peritonitis, rupture of the wall of the duodenum by a tightly packed mass of worms, severe gastro-enteritis due to gross infestation, and other mechanical and possibly chemical causes, the latter involving the absorption of toxic worm products by the host.

As far as has been determined, the life history of *A. equorum* is essentially similar to that of the swine ascarid, *A. suum*. The eggs produced by the female worm pass out with the manure and develop on the pasture and in insanitary stables to the point where each viable egg contains an infective embryo. When such infective eggs are swallowed by horses or other equines, the embryo escapes from the egg-shell in the alimentary canal of the host. The liberated larvae make their way to the liver via the blood-stream, and thence to the lungs. In the course of these migrations the larvae produce pathological changes in these organs. The young worms probably get back to the small intestine by crawling up the trachea and down the esophagus, or they may be coughed up and swallowed. On getting back to the small intestine, they settle down and develop to fertile maturity.

In considering the pathogenicity of horse ascarids it is important to bear in mind that the larvae may produce serious injury to horses, especially to foals, as a result of their migrations through the lungs, and if many larvae go through this organ at the same time a serious, if not a fatal, pneumonia may develop. In a study of experimental ascariasis in colts, *Hadwen*[3] has actually demonstrated symptoms of pulmonary disturbance as evidenced by rapid breathing, rise in temperature and a cough. Postmortem examination of the experiment colts revealed the lesions of pulmonary ascariasis and showed the presence of the larvae in the lungs.

The lesions produced by ascarids in the intestine of the horse are those of a mild catarrhal condition or low-grade inflammation of the mucosa. There is also a strong probability that these worms elaborate toxic products which are absorbed by the host and produce a clinical picture of intoxication. The presence of toxic products in various chemical fractions of *Ascaris* has been definitely demonstrated.

*Treatment:* There are two dependable drugs for the removal of the equine ascarids, namely, carbon bisulphid and carbon tetrachlorid, and the same procedures recommended in connection

with the use of these drugs for the removal of bots apply equally to their use for the removal of ascarids. The efficacy of these drugs for horse ascarids is approximately 100 per cent.

*Prevention:* Prevention of ascariasis in horses should follow the same general procedures which have given uniformly successful results in preventing roundworm infestation in swine. The following plan which is based on the system of swine sanitation developed by the U. S. Bureau of Animal Industry in McLean County, Illinois, with modifications to meet the general scheme of horse husbandry, is suggested as a theoretically sound working basis. The feces of pregnant mares should be examined microscopically for roundworm eggs and if eggs are found to be present, infested mares should be treated with carbon bisulphid or carbon tetrachlorid, preferably in the earlier stages of pregnancy. In so far as possible, precautions should be taken to prevent reinfestation by pasturing such mares on clean pastures and stabling them in clean stalls. Shortly before foaling, the foaling barn, which should be of sanitary construction, should be thoroughly cleaned and all litter should be removed. It should then be thoroughly washed with hot water and lye.

The mare and foal should be pastured in a clean paddock for at least two weeks and kept in a clean stall which has been thoroughly cleaned and washed with hot water and lye. This preliminary period of special care is designed to protect the foal from picking up the eggs of the roundworm at a period of life when it is perhaps more susceptible to the effects of parasites and has less resistance to them than subsequently. The mare and foal should then be moved to clean pasture, that is a pasture which has not previously been occupied by infested horses, and should be stabled in a barn adjoining the pasture. The stall should be frequently and thoroughly cleaned and the manure removed every day. If the colts can be carried through the first year without being exposed to roundworm infestation there are possible chances of their developing an age resistance, at least a relative resistance, to those worms, although this point requires experimental proof. At any rate, by observing the precautions outlined in this paper colts will be protected to a great extent against roundworms and to a lesser extent against other parasites during a period when they can least withstand the effects of parasitism.

## Strongyle Parasites of the Colon and Cecum of Horses

Horses and other species of equines harbor numerous species of strongyles in the cecum and colon. Up to 1902, only two or three species were commonly reported in text-books and these were assigned to a single genus (*Sclerostoma* or *Strongylus*). In 1901, Looss,[4] working in Egypt, described and figured 19 distinct species of strongyles, representing 4 genera, from horses and donkeys. By 1918 the number of genera as reported by Ransom and Hadwen[5] had increased to 5 and the number of species to 27. Theiler,[6] in 1923, lists 8 genera and over 50 species of strongyles from the colon and cecum of equines. Cram,[7] in 1924, recognizes 14 distinct genera and 59 species and varieties of strongyles from these animals and since 1924 new forms have been added to the list.

The forms of strongyles best known to veterinarians are the so-called red worms, blood worms or palisade worms, belonging to the genus *Strongylus*, of which three species are of common occurrence in equines. The largest species of this genus is known as *Strongylus equinus* and has three teeth at the base of the mouth capsule; the smallest form is *S. vulgaris* which has but a single tooth at the base of the mouth capsule, while a form more or less intermediate in size between these two species is *S. edentatus* which lacks teeth at the base of the mouth capsule.

The life histories of the three species of *Strongylus* are in the main very similar, as far as they are known. The eggs produced by the female worms pass out in the manure and develop on the pasture. The embryo hatches after a period of development which is largely contingent on temperature and moisture conditions, high temperatures accelerating and low temperatures retarding the rate of development of the egg, and moisture being indispensible to development. Desiccation has been shown to be fatal to the eggs. After undergoing two molts, the free-living larvae reach the infective stage. Apparently these larvae are taken into the alimentary canal of the horse by way of the mouth, and develop ultimately to fertile maturity, apparently after more or less wandering, as a rule, through the body tissues. The details of the life history of the various species of *Strongylus* have not been worked out and it is not definitely known to what extent the larvae which are found in various locations outside of the alimentary canal represent forms which have strayed accidentally from their normal course and to what extent these

migrations are customary phases of the normal life cycle. Since the wanderings are so general, presumably some wandering, at least, is normal.

Immature forms of *S. equinus* have been encountered in various locations outside the alimentary canal, namely the pancreas, liver, kidneys, hepatogastric ligament, mesentery, lungs, and other locations. Agamic forms of *S. edentatus* occur under the peritoneum, especially on the right side, in the pleura, the peritoneal cavity, testes, the spermatic cord, hepatic ligaments, peri-renal connective tissue, muscles of the fore leg, and according to certain observations they also occur in the liver, spleen and pancreatic connective tissue. Immature forms of *S. vulgaris* occur in aneurisms in the anterior mesenteric artery, in the mesenteric lymph-glands, in submucous nodules of the walls of the large intestine and occasionally in hepatic, renal, spermatic and other arteries. Immature forms of this species also have been found in the right heart and in nodules in the liver and lungs.

The three species of *Strongylus* not only produce injury to the host by direct abstraction of blood, but they also injure the epithelium at the points of their attachment to the mucosa, thus exposing the injured mucosa to bacterial invasion. The major pathological significance of *Strongylus* infestation in horses relates to the occurrence of immature forms of *S. vulgaris* in arterial blood-vessels, especially in aneurisms in the anterior mesenteric artery. Over one hundred worms have been removed from a single aneurism. The portion of the artery in which these worms produce lesions dilates and develops into an aneurism which may attain the size of a child's head.

The other species of strongyles which occur in the colon and cecum of equines are more or less closely related to *Strongylus* and from this it may be inferred that they have life histories essentially similar to that of the genus *Strongylus*, as far as concerns the free-living stages of the worms in manure and on the pasture, and probably also as regards the mode of entry into the host. One species, *Triodontophorus tenuicollis*, deserves special consideration because it produces ulcerations of the mucosa of the colon. The worm is supplied with blade-like teeth, which probably play an important part in the production of the ulcers.

Aside from the pathological conditions resulting from the wandering habits of the larval forms of the species of *Strongylus*, these worms and the other related species which occur in the large intestine of equines produce a general picture commonly referred

to as strongylidosis, which is characterized by weakness, anemia, emaciation, poor appetite, rough coat, sunken eyes and various digestive disturbances commonly associated with intestinal parasitism.

*Treatment:* The horses to be treated should be fasted for 36 hours and then treated either with oil of chenopodium or carbon tetrachlorid, the doses given below being for animals weighing approximately 1000 pounds.

Four to five fluid drams (16 to 20 cc) oil of chenopodium by stomach-tube or in capsule, immediately preceded or followed by one quart of raw linseed oil for choice, or by an aloes ball. Following this treatment, which has an efficacy of nearly one hundred per cent, blood strongyles and other strongyles may continue to pass for six days or more.

Carbon tetrachlorid in doses of 6 to 12 fluid drams (25 to 50 cc) is as effective as oil of chenopodium for blood strongyles, but only about 50 per cent effective against small strongyles as far as it has been carefully tested. In the cases of pregnant mares, carbon tetrachlorid is preferable to oil of chenopodium, the latter drug being dangerous to pregnant animals.

*Prevention:* In addition to treatment, one indicated preventive measure against strongyle infestation is pasture rotation. In the absence of information concerning the period required for the development of the worms to fertile maturity in the body of equines, no definite scheme of pasture rotation can be formulated. Systematic treatment with anthelmintics will cut down the supply of eggs that are deposited on pastures with manure. Frequent removal of manure and bedding from stables will diminish the chances of infestation from that source, and the disposal of manure in such a manner as to prevent it from contaminating the pasture is another essential prophylactic measure.

There still remains to be considered the infestation resulting from the manure which is deposited by horses on pastures and which constitutes the greatest source of danger, since each deposit is a focus of infection and of pasture pollution with the infective larvae. Aside from the actual removal of the manure, which should be undertaken if possible and if the expense involved is warranted, the natural drying of manure on pastures, which is destructive to eggs and larvae, may be aided by breaking up the manure in order to hasten the process of desiccation. The surface of manure deposits becomes sufficiently dry in a few days to destroy the eggs and pre-infective larvae contained in

them, but the interior of the deposits retains sufficient moisture to enable the free-living stages of strongyles to maintain their vitality for a long time, even for a period of several months. The mechanical breaking up of such deposits and the spreading of them in as thin a layer as possible, will tend to promote desiccation and cut down the supply of viable eggs and larvae.

### Pinworms

Pinworms, *Oxyuris equi*, occur in the colon, cecum and rectum of equines, and aberrant specimens occasionally enter the vagina from the anal region. As a rule eggs of pinworms are not eliminated as such from the host, but the gravid females pass out in the manure and oviposit outside of the host, or the gravid females migrate through the anus and deposit eggs in crusts on the margin of the anus. As far as is known, infestation results from swallowing the infective eggs that have undergone a preliminary period of development to the point where each egg contains an embryo.

Pinworms in horses produce an anal pruritis, the itching being attributed to the passage of the female worms to the perineal region or to the crushing of these worms during their passage through the anus. The itching causes the affected animal to rub the tail and buttocks against any convenient object, a common result being the rubbing off of the hair at the root of the tail. In exceptional cases the perineal region may become excoriated as a result of persistent rubbing. There is also a considerable amount of evidence indicating that the worms in the large intestine are not altogether harmless, and that they may produce symptoms of anemia and digestive disturbances.

*Treatment:* Oil of chenopodium, as recommended in connection with treatment for the removal of strongyles, is equally effective for the removal of pinworms. Two fluid drams of oil of turpentine may be substituted for oil of chenopodium, and this drug should also be immediately preceded or followed by linseed oil or an aloes ball.

### Tapeworms in Horses

Horses in the United States are occasionally infested with tapeworms belonging to the genus *Anoplocephala*, of which three species occur in the horse. The life histories of these tapeworms as well as those of related species which occur in ruminants and in other herbivorous animals, have not yet been ascertained, and in the absence of this information control measures can not be formulated.

Of the three species of horse tapeworms known to occur in the United States, *A. magna*, which occurs in the duodenum and upper jejunum, appears to be the most common, *A. mamillana* from the jejunum and ileum being less common, and *A. perfoliata*, which commonly occurs in the ileum and cecum, being comparatively rare.

Tapeworms in horses may give rise to digestive disturbances, especially when the infestation is heavy. In exceptional cases severe emaciation and anemia have been attributed to these parasites. *A. perfoliata*, which appears to be the least common form in American horses, is generally regarded as the most injurious of the horse tapeworms because it is so firmly attached to the mucosa that the heads of the worms produce, by mechanical action, small ulcerative depressions with elevated margins.

Very little is known regarding treatment for horse tapeworms, and as a rule this infestation is rarely diagnosed antemortem. Male fern or kamala may prove effective against these worms but critical tests are necessary to establish the efficiency of these or other drugs for the removal of *Anoplocephala*.

## Summary

The essential facts with reference to gastro-intestinal parasitism in horses and other equines as outlined in this paper may be briefly summarized as follows:

1. Three species of bots, *Gastrophilus intestinalis*, *G. nasalis* and *G. haemorrhoidalis*, occur in the stomach, firmly attached to the mucosa, the last mentioned species also attaching itself to the upper part of the duodenum, the rectum and the anus. In addition to the irritation to the lining of the stomach produced by these parasitic maggots, the adult flies, especially those of *G. haemorrhoidalis*, cause considerable annoyance to horses by their egg-laying habits and from some psychological fear of the fly by the horse.

2. Three species of nematodes belonging to the genus *Habronema*, *H. muscae*, *H. microstoma* and *H. megastoma*, and one species of trichostrongyle, *Trichostrongylus axei*, occur in the stomach, all of these forms being more or less pathogenic. *H. megastoma* produces large gastric tumors and *T. axei* produces pathological changes in the gastric mucosa which vary from small wart-like growths to relatively large, raised, umbilicated growths resembling adenomas.

3. A granular dermatitis in horses, known as summer sores, is commonly associated with larvae of *Habronema*, and a form of conjunctivitis due to these larvae has also been observed. Nodules in the lungs may be produced by *Habronema* larvae.

4. The large intestinal roundworm of equines, *Ascaris equorum*, is a potentially dangerous parasite for foals, partly because the larvae of these worms migrate through the lungs and are capable of producing pneumonia, and partly because of the bad effects due to the worms in the intestines. These worms may be controlled by a system of sanitation designed to protect young animals from exposure to the eggs of the roundworms.

5. Three species of blood strongyles, *Strongylus equinus*, *S. edentatus* and *S. vulgaris*, and numerous species of smaller strongyles occur in the large intestine and produce a clinical picture of gross parasitism known as strongylidosis. The larvae of *Strongylus* occur in various locations outside of the alimentary canal, those of *S. vulgaris* occurring in arteries, especially in the anterior mesenteric artery, where they produce aneurisms.

6. Pinworms, *Oxyuris equi*, occur in the large intestine and produce an anal pruritis.

7. Three species of cestodes, *Anoplocephala magna*, *A. mamillana* and *A. perfoliata*, occur in the small and large intestine of horses, but nothing is known at the present time regarding the life history of these parasites and very little about treatment or control in general.

8. There are several dependable drugs for the removal of certain parasites from the alimentary canal. Carbon bisulphid is effective against bots and ascarids; carbon tetrachlorid is effective against ascarids, strongyles and to some extent also against bots; oil of chenopodium is effective against strongyles and pinworms; oil of turpentine is effective against pinworms. These treatments are based on the work of Hall[8] and his collaborators.

9. In addition to medicinal treatment, gastro-intestinal parasites of equines may be controlled to a certain extent by proper disposal of manure in order to prevent flies from breeding and to diminish the contamination of pastures by cleanliness about the stables and yards, the removal of manure from pastures, if possible, or the breaking up of manure masses to promote the process of drying, and by special precautions with reference to young animals to tide them over the period when they are most susceptible to the effects of parasitism.

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## JOIN THE WOMEN'S AUXILIARY

The memory of the splendid meeting we enjoyed so much this summer, in Minneapolis, and the great interest shown in the work of the Women's Auxiliary to the A. V. M. A. is very gratifying and creates a desire to enlarge our activities. This may be done by an increased membership. Thirty-seven new names were added to our membership list at this meeting, and, I am sure, ladies, if you knew more about the work we are doing, you would hasten to join.

You may know about our Student Loan Fund (made possible by our dues of one dollar a year); but, do you know that, since 1922, we have made loans of $3075 to worthy young men, who, perhaps, would have been unable to continue their college work but for our assistance? These eleven seniors in accredited veterinary colleges have been able to graduate and to enter the veterinary profession with a standing in the professional and scientific world which the older members of the profession have not enjoyed.

An invitation is extended to every woman who is the wife, mother, daughter or sister of a member of the A. V. M. A. to join. It means a great deal to be a part of a worth-while enterprise. Someone has said, "It is the *growing* thing that receives attention." Let us make the Women's Auxiliary *such* a growing thing that its activities will be followed from year to year. Just send your name and address (with the first year's dues of one dollar and fifty cents) to the Secretary, Mrs. S. E. Hershey, 1109 Washington St., Charleston, W. Va., and have your name added to our list.

Begin to make plans to come to the Detroit meeting, enjoy the entertainment, and see what we are doing.

MRS. PETER MALCOLM, *President.*

# CLINICAL AND CASE REPORTS

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

## USE OF KAMALA IN TAPEWORM INFESTATIONS OF SHEEP

*By* T. O. BRANDENBERG, *Lakota, N. D.*

During the past five years, thousands of sheep have been placed on North Dakota farms. These have come in most part from Montana and South Dakota and are grade Rambouillets. Little trouble has been had with parasites until the last two or three years. Since that time, however, losses due to parasites have increased by leaps and bounds. This has been partly, if not wholly, due to a violation of the laws of sheep-raising. In some instances it was through lack of money for proper fencing and other equipment, in others a lack of knowledge regarding the handling of sheep on the same farm over a period of years.

Of all the bowel parasites, the broad tapeworm—*Moniezia expansa* (*Taenia expansa*) or *Moniezia alba* (*Taenia alba*)—has been the cause of more loss and been apparently the hardest to control. Particularly is this true of flocks located in the Red River Valley, or in the rolling land further west, where pastures contain sloughs or moist flats during most of the year. Here it has been found that the changing of pastures every few weeks will not in itself control tapeworm infestation, although apparently it has been lighter where these precautions have been taken.

Associated with tapeworm infestation, besides the typical diarrheas and loss in condition, is also found more or less affection of the respiratory tract, manifested by discharge from the nose, coughing, pneumonia and pleurisy. Probably one of the underlying causes of heavy losses during the past winter has been the depleting effects of parasites of this kind the previous season.

Veterinarians and shepherds have posted thousands of sheep the past season and with ease have found the cause of their losses when due to the broad tapeworm. They have treated their flocks with the prescribed copper sulphate solution and nicotin and have had a desirable improvement for a few days or weeks, checking the losses among lambs and lessening the diarrhea.

Generally this abatement has been followed by a recurrence of the previous symptoms and deaths among the lambs, sometimes in epizootic proportions.

Extract of male fern, combined with powdered areca nut in oil, has been used by the writer with good results, but the cost of the remedy in large bands, together with the slowness and tediousness of administration, made this remedy impractical. We began our experiments in the late summer of 1927 and have since that time gone through the category of teniacides. We have finally settled on powdered kamala and copper sulphate as the most efficient for the removal of all bowel parasites of sheep. It is a veterinarian's weapon against tapeworm and not safe in the hands of laymen.

Hartmann recommends kamala very highly for tapeworm and liver fluke and had no bad results when given in proper dosage. Other writers warn us of the persistent diarrhea following its use in lambs. Death followed its use in lambs with one-sided pneumonia or pleurisy, or otherwise seriously weakened. Anyone who has held careful autopsies on lambs dying or just dead from tapeworm infestation can readily imagine a diarrhea following the expelling of the worms when he sees the extent of the inflammation in the infested bowel. Kamala being a purgative, it would certainly not in itself allay this inflammation except by removing the cause of the irritation.

Kamala is very efficient but not fool-proof. Veterinarians should learn to use it intelligently in sheep. Our method of treatment has been used on many thousands of sheep, yet considerable experimental work could be done to ascertain just how small the dose of kamala could be and still remove the parasite. Our method of treatment is as follows:

By autopsy determine that the broad tapeworm is the cause of losses in the flock. Take previously prepared capsules (2-dram, hard gelatin) made in the following way: Mix thoroughly with each pound of powdered kamala, three ounces of freshly powdered copper sulphate. Table I shows the dosage.

TABLE I—*Dosage for sheep*

| CAPSULE | DOSE | SIZE OR AGE OF SHEEP |
|---|---|---|
| No. 1 | 1½ dram | Adult sheep |
| No. 2 | 1 dram | 60 to 90 lb. lambs |
| No. 3 | 40 grains | 40 to 60 lb. lambs |
| No. 4 | 30 grains | 25 to 40 lb. lambs |

Sheep should be starved from 16 to 24 hours, and if previously fed on soft feeds results are better.

In a flock of 600 sheep and lambs, five of the weakest lambs were selected for experimentation. Each weighed from 30 to 40 pounds, all about the same, very weak and scouring badly. All were placed in pen and starved for 24 hours. Results are shown in table II.

TABLE II—*Test on five lambs*

| LAMB | WEIGHT (LBS.) | STARVED (HRS.) | DOSE (GRS.) | TIME KILLED (HRS.) | AUTOPSY FINDINGS |
|---|---|---|---|---|---|
| 1 | 30 | 24 | 30 | ½ | Capsule entirely dissolved in the rumen and contents were beginning to mix with the ingesta. Mild infestation of stomach worms in abomasum, 18 broad tapeworms in small intestine, no lung worms or other parasites found |
| 2 | 35 | 24 | 30 | 1 | Contents of capsule well mixed in rumen and some found in abomasum, mild infestation of stomach worms, 16 broad tapeworms in small intestine |
| 3 | 30 | 24 | 30 | 24 | No stomach worms, no tapeworms or heads, wall of small intestine covered with dead stomach worms |
| 4 | 30 | 24 | 30 | 24 | Same condition as above |
| 5 | 30 | 24 | 30 | 24 | Same as above, with exception of two live fringed tapeworms found with heads in bile-duct |

The autopsy work was carefully done, the intestinal tube being opened from end to end with scissors and a careful examination made for heads or parts of tapeworms.

Our routine method of handling a flock after treatment is to withhold all food for a few hours, then give them a feed of dry hay for fill, then pasture and in 24 hours they are ready and must be placed on an entirely new pasture of high, well-drained land, if possible.

## SUMMARY

Kamala combined with copper sulphate, on account of its corrective action, is our most valuable teniacide in large bands of western sheep, on account of its great efficiency, ease of administration when in capsule and its small cost. It should be administered by a veterinarian and he should acquaint himself with the proper dosage and use of this drug.

# THE OCCURRENCE OF THE SWINE KIDNEY WORM (STEPHANURUS DENTATUS) IN THE URINARY BLADDER AND URETERS OF THE HOST ANIMAL

*By* E. M. NIGHBERT, *Associate Veterinarian, Zoological Division*
*U. S. Bureau of Animal Industry*
*Branch Office, Moultrie, Georgia*

The kidneys and more especially the perirenal kidney region are the usual sites of infestation for the mature kidney worm. It is in this region that the male and the female mate. Eggs are deposited in the pockets where the worms lie in the tissues and these eggs pass out through fistulous canals to the ureters or the pelvis of the kidney, then into the bladder, and from here they pass to the outside world with the urine.

There has been more or less uncertainty regarding the ultimate fate of the adult worms occurring in their natural location in the kidney region, as males and females are found in pus pockets. In the writer's experience dead worms or fragments of dead worms are seldom found in these pus pockets in the kidney fat. The literature on these worms seems to lack definite information on this subject. Consequently this paper puts on record recent observations which add to the small stock of information.

In the collection of urine from swine for the purpose of examining it for the presence of kidney-worm eggs, the following observations are made: On August 16, 1926, an aged sow in poor physical condition was catheterized and two fluid ounces of urine drawn from the bladder. The urine as observed in a clear-glass laboratory dish showed flocculent material and rather heavy casts. Urine taken from the clearer portion of the sample and examined microscopically showed only a few kidney-worm ova. A sample from the urine showing heavy flocculent material and examined microscopically showed numerous kidney-worm eggs among the casts and adhering to them. In the examination of the heavier casts microscopically, it was noted that they were semi-transparent in appearance and were held together with threads of a slightly dark color. This material apparently consisted of fragments of the integument and reproductive organs of the kidney worm.

On July 31, 1928, in a postmortem examination on a sow, eleven months old, one adult kidney worm was removed directly

from the lumen of the ureter. This pig showed heavy kidney-worm infestation in kidneys, kidney fat and liver.

These findings show that the kidney worm, as well as its eggs, can, and sometimes does, leave its natural location in the kidneys and kidney fat of the host animal and pass out through the urinary tract. Whether this is the usual fate of these worms after they die is still a question requiring further observations.

## COTTONSEED-MEAL POISONING?

*By* N. S. MAYO, *North Chicago, Ill.*

In cases where cattle have been fed large amounts of cottonseed meal, one of the first symptoms of so-called cottonseed-meal poisoning usually noted by the stockman, was impaired vision, particularly at dusk or later. This condition was often so marked that it was necessary to feed range animals before dusk to avoid alarming them.

Investigations in human medicine have shown that functional hemeralopia or "night-blindness" is due to a shortage of vitamins. Aykroyd has shown that night-blindness in Newfoundland is due to a lack of vitamin A. Is it not possible that the impaired vision of cattle fed on cottonseed meal may be attributed to the same cause and not a toxic substance in the cottonseed meal?

## PICTURE OF NOGUCHI AVAILABLE

The Denver Chemical Manufacturing Company, publishers of *The Bloodless Phlebotomist*, report that No. II of Volume VII of their publication will have a total circulation of 1,250,000 copies. This issue has been published in Spanish, French, German, Italian, and Japanese, as well as English. On the cover page appears a reproduction of a crayon drawing of the late Dr. Higeyo Noguchi, the eminent Japanese scientist who gave his life for humanity a few months ago, while studying yellow fever in Africa. If any reader of the JOURNAL would like to have a copy of this picture suitable for framing, it may be obtained free of charge by writing the Denver Chemical Manufacturing Company, 163-167 Varick St., New York, N. Y.

The U. S. Department of Agriculture reports that the average American eats about 5½ pounds of lamb and mutton per year.

# ARMY VETERINARY SERVICE

## CHANGES RELATIVE TO VETERINARY OFFICERS

Captain John W. Miner, V. C., is relieved from further observation and treatment at Walter Reed General Hospital, Army Medical Center, Washington, D. C., and will comply with orders directing him to report to Fort Leavenworth, Ks., for duty.

Captain Everett C. Conant, V. C., is relieved from duty at Fort Bragg, N. C., on or about October 15, 1928, and directed to report to Fort Hamilton, N. Y., for duty.

Captain James L. Barringer, V. C., is relieved from duty at Reno quartermaster depot, Fort Reno, Okla., on or about October 15, 1928, and directed to report to Fort Bragg, N. C., for duty.

Captain James R. Sperry, V. C., is relieved from duty at Fort Hamilton, N. Y., on or about September 15, 1928, and will report to commanding officer, Reno quartermaster depot, Fort Reno, Okla., for duty.

Captain Edward M. Curley, V. C., is relieved from his present assignment at New York general depot, Brooklyn, N. Y., and will sail from New York City on or about December 28, 1928, for duty in the Hawaiian Department.

First Lieutenant Harry R. Leighton, V. C., is relieved from duty at Fort Sam Houston, Texas, and will sail from San Francisco, Calif., on or about February 6, 1929, and report for duty in the Philippine Department.

### Reserve Corps

*New Acceptances*

| | | |
|---|---|---|
| Allen, Clifford Lee | Capt. | 1595 Forrest Ave., Memphis, Tenn. |
| Cox, John L. | 2nd Lt. | R. D. No. 2, Willoughby, Ohio. |
| Michael, S. T. | 2nd Lt. | Univ. of Calif., Berkeley, Calif. |

*Promotions*

O'Brien, James H., 254 Lake Avenue, Worcester, Mass., to Captain.
O'Connell, John A., Boston, Mass., to Major.
Walden, Robert S., Lennox, S. D., to 1st Lieutenant.

*Separations*

| | | |
|---|---|---|
| Ranck, Edward M. | Lt. Col. | Transferred to Auxiliary Reserve. |
| Myers, Willis A. | Major | Transferred to Auxiliary Reserve. |
| Krubsack, Grover | Capt. | Appointment terminated. |
| McKee, Andrew J. | 2nd Lt. | " " |
| Morrow, Charles D. | 2nd Lt. | " " |
| Edgar, Jean Rogers | 2nd Lt. | " " |
| George, Albert E. | Capt. | " " |
| Hansen, Frederick | 1st Lt. | " " |
| Parker, Elmer B. | 1st Lt. | Failed to accept reappointment. |
| Reece, Chester L. | 2nd Lt. | " " " |
| Yandell, Donald A. | 2nd Lt. | " " " |

## BUREAU TRANSFERS

Dr. Hugh J. Clary (St. Jos. '20) from South St. Paul, Minn., to Winona, Minn., on meat inspection.

Dr. Wilbur B. Stegner (McK. '18) from Omaha, Nebr., to Lincoln, Nebr., on tuberculosis eradication.

Dr. Albert M. Meade (K. C. V. C. '09) from Lincoln, Nebr., to Omaha, Nebr., on meat inspection.

Dr. Cecil R. Wilhoit (K. C. V. C. '12) from Philadelphia, Pa., to Lincoln, Nebr., on tuberculosis eradication.

# COMMUNICATIONS

## MUGGINS LAID TO REST

To the Editor:

On the green lawn in the shade of a sheltering palm in front of the Administration Building of the Union Stock Yards, and directly under my office window, is a spot which I long ago selected for a few restful moments after lunch each day during the summer months. Last Saturday, this particular plot was consecrated to the memory of Muggins, the famous 38-year-old cow-pony whose death occured the day before.

This neck-reined wonder who never had a bit in his mouth, who attended more rodeos, and who "cut" more cattle than any other horse in the history of the western frontier, was laid tenderly to rest in the parkway, and the picturesque and impressive funeral services were attended by many people, including cowboys and cowgirls on their steeds. Floral offerings were prominent, cameras were in action and eulogy was read. This beautiful tribute was alike unusual and touching. There were tears unhesitatingly wiped from the eyes of a few, as with bowed heads a number of the old guard of the Wild West solemnly listened to the recounting of the feats of this remarkable equine who was endowed with almost human intelligence. A boy scout sounded taps. And one of these days a monument will mark the grave where Muggins lies under a pasture far richer than any range he had known in his long, wild, useful life.

*Los Angeles, Calif., September 18, 1928.* R. H. McMullen.

## STATEMENTS ON TUBERCULOSIS QUESTIONED

To the Editor:

I have just read the address by Dr. C. H. Mayo, published in the Journal of the American Veterinary Medical Association for September, 1928, page 563, on "The Danger to Man of Bovine and Avian Tuberculosis." It shows a very incomplete knowledge of the history of the controversy over the infection of human beings by the bovine variety of tubercle bacillus. On one point only of this do I comment.

On page 564, second paragraph, the statement as given would lead one to suppose that the question had not been studied until

Koch's address in 1901, and that his address was the reason for investigations carried out by others, some of which are mentioned. As an actual fact, the State Live Stock Sanitary Board of Pennsylvania, of which Dr. Leonard Pearson was Secretary and the writer Bacteriologist, had been studying this matter since 1897 and, at the same Congress at which Koch expressed his erroneous ideas, a paper was read by the writer, which gave a review of the work done in Pennslyvania, and submitted evidence to the contrary. At another session of the same Congress, further evidence was brought forth and the position of Koch attacked.

During the same year, these experiments were carried further and the results published in May, 1902. The first paper referred to can be found in the *Lancet* (London), August, 1901, as well as in the reports of the London Congress on Tuberculosis, and there seems to be no reason for ignorance of the facts. Historians, above all others, should be accurate in their statements.

Another point which needs comment is the statement by Dr. Mayo concerning two cases of alleged avian tuberculosis seen at the Mayo Clinic by himself, which he states "was demonstrated surgically and pathologically." These two cases were reported in the *Southern Medical Journal* for January, 1926, page 29. It is to be noted that in neither of these cases were cultures obtained, nor is there any evidence of the inoculation of animals, so that one may very well question the diagnosis of avian tuberculosis. One may also ask how surgery can diagnosticate avian tuberculosis. Examination of the latest editions of a number of standard books on pathology fail to show any diagnostic features of avian tuberculosis in the human. Stengel and Fox (1927), page 360, say: "Despite the similarity of the bacilli of the human and avian types of tubercle bacilli, it does not seem that the latter can produce tuberculosis in man. In the few cases in which avian bacilli have been isolated from human lesions, the simultaneous presence of human bacilli was not satisfactorily excluded." Certainly it was not proven in either case under discussion, though it appears that this might easily have been done by inoculation.

Without denying that the avian bacillus is sometimes transmitted to human beings, the writer desires to protest against the recording of such cases without definite proof.

MAZYCK P. RAVENEL, M. D.

*University of Missouri,*
*Columbia, Mo., September 22, 1928.*

**Proceedings of the Sixty-fifth Annual Meeting, Minneapolis, Minnesota, August 7 to 10, 1928**

## SECTION OF GENERAL PRACTICE

### WEDNESDAY MORNING, August 8, 1928

The first session of the Section on General Practice was called to order at 9:20 o'clock by Dr. J. N. Frost, chairman.

CHAIRMAN FROST: The Section will come to order. The first on the program is the Chairman's address. We have such a full program that the Chairman is not going to take any time to make an address. We probably have more papers than we will be able to get through with as it is.

The next is the Secretary's report. Have you any report?

SECRETARY ALTHOUSE: No report.

The following program was then presented:

"Field Practice Methods of Immunizing Pigs Against Hog Cholera in the Corn Belt," Dr. Henry Hell.

"A Study in the Simultaneous and Serum-Alone Methods in the Treatment of Cholera-Infected Hogs," Dr. C. N. McBryde.

"Vulvovaginitis in Swine," Dr. S. H. McNutt.

"Some Common Diseases of Sheep," Dr. W. L. Boyd.

"Prevention and Control of Sheep Parasites in Pennsylvania Flocks," Drs. Henry W. Turner and Joseph G. Moon. (Read by Dr. Turner.)

"Diseases of Range Sheep," Dr. E. T. Baker. (Read by Dr. W. L. Boyd.)

"Glucose Therapy," Mr. J. H. Weiner.

The session adjourned at 12:00 noon.

ADJOURNMENT

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### THURSDAY MORNING, August 9, 1928

The second session was called to order at 9:15 o'clock by Chairman Frost.

The following program was presented:

"Foreign Bodies in Bovines," Dr. E. E. Wegner.

"Returning the Uterus," Dr. E. E. Bittles.

"The Breeding Efficiency of a Herd of Cows Negative to the Agglutination Test for Abortion," Dr. Herbert Lothe.

"The Rejuvenation of Bulls," Dr. T. A. Sigler.

"Poultry Problems in a General Practice, with Special Reference to Coccidiosis," Dr. John Patterson.

"Breeding Diseases of the Horse," Dr. W. W. Dimock.

"Investigations on Anaplasmosis in Cattle," Dr. George W. Stiles.

"The Practical Handling of Anthrax Outbreaks in Badly Infected Territory," Dr. O. M. Norton.

"Bang Bacillus Disease in Bulls," Dr. C. W. Springer. (Read by title.)

"Clinical Manifestations and Surgical Treatment of Lead Poisoning in the Horse," Dr. P. G. MacKintosh. (Read by title.)

CHAIRMAN FROST: Next we come to the election of section officers. The first will be nominations for chairman.

. . . Dr. Wm. M. Bell, of Nashville, Tennessee, was nominated. . . .

. . . There being no further nominations a motion was regularly made, seconded and carried that the Secretary be instructed to cast the unanimous ballot of the Section for Dr. Bell as chairman for the ensuing year. . . .

SECRETARY ALTHOUSE: The ballot for the election of Dr. Bell as chairman of this Section is cast.

CHAIRMAN FROST: Next in order will be nominations for secretary.

. . . Dr. E. P. Althouse, of Sunbury, Pa., was nominated by Dr. H. W. Turner. The nomination was seconded by Dr. T. H. Ferguson. There being no further nominations a motion was regularly made, seconded and carried that the Chairman be instructed to cast the unanimous ballot of the Section for Dr. Althouse as secretary for the ensuing year. . . .

CHAIRMAN FROST: I hereby cast the unanimous ballot of the Section for Dr. Althouse as secretary for the ensuing year.

A motion is in order to adjourn.

DR. W. L. BOYD: I move we adjourn.

. . . The motion was seconded and carried. The meeting adjourned at 12:50 p. m. . . .

ADJOURNMENT

## SECTION ON SANITARY SCIENCE AND FOOD HYGIENE

### WEDNESDAY MORNING, August 8, 1928

The first session was called to order at 9:00 o'clock by Dr. R. V. Rafnel, chairman.

CHAIRMAN RAFNEL: The first number on our program is an address by the Chairman. I think they just put this in to fill up the program as I have no address to make. Dr. Lytle has no Secretary's report so we will proceed with the papers.

The following program was presented:

"The Practical Relation of Autopsy Findings to Field Work in Tuberculosis Control," Dr. J. A. Barger.

"Sensitivity, Infectivity and Intertransmissibility of Tuberculosis," Dr. A. F. Schalk.

"The Present Status of Infectious Abortion Control from a Laboratory Standpoint," Dr. Ward Giltner.

"Johnin versus Avian Tuberculin as a Diagnostic Agent for Paratuberculosis of Cattle," Dr. W. A. Hagan.

"Results from the Use of Huddleson's Vaccine for Bang's Disease," Drs. Ward Giltner, I. F. Huddleson, L. T. Clark and A. S. Schlingman. (Read by Dr. Schlingman.)

. . . The session adjourned at 12:30 p. m. . . .

### ADJOURNMENT

### THURSDAY MORNING, August 9, 1928

The second session was called to order at 9:00 o'clock by Dr. R. V. Rafnel, chairman.

The following program was presented:

"Regulatory Work with Bacillary White Diarrhea," Dr. B. T. Simms.

"Some Obscure Diseases of Sheep," Dr. Hadleigh Marsh.

"Rabies Control in Indiana," Dr. F. H. Brown.

"Rabies Control in Michigan," Dr. B. J. Killham.

CHAIRMAN RAFNEL: The next order of business is the election of officers of the Section for the ensuing year.

DR. ADOLPH EICHHORN: Mr. Chairman, I take great pleasure in nominating Major Kelser for chairman.

DR. H. K. WRIGHT: I second the nomination.

. . . It was duly moved, seconded and carried that Major Kelser be elected chairman of the Section by acclamation. . . .

CHAIRMAN RAFNEL: Nominations for secretary are now in order. Whom will you have for secretary?

. . . Dr. F. H. Brown, of Indianapolis, Ind., was nominated and his nomination was duly seconded. A motion prevailed that the nominations be closed. Dr. Brown was then elected secretary by acclamation. . . .

. . . The session adjourned at 12:00 noon. . . .

ADJOURNMENT

## SECTION ON SMALL ANIMAL PRACTICE

WEDNESDAY MORNING, August 8, 1928

The first session of the Section on Small Animal Practice was called to order at 9:00 a. m. by Dr. J. V. Lacroix, chairman.

CHAIRMAN LACROIX: The first thing on the program is the Chairman's address. That operation will be as painless as possible, and will consume very little time. The Chairman has prepared no address. It is perhaps appropriate to say, however, that our section of the A. V. M. A., in its deliberations, has attracted phenomenal attention. The reasons for that will be obvious when I explain that this interest is the comparative newness of the work. It has been estimated that approximately one-half of the hospitals for small animals have been built within the last six or eight years. Half of the hospitals that exist in this country, at that rate, have been built within a decade. Half of all the practitioners in the United States will be hospitalizing some small animals. The very nature of the work we do, particularly when we have facilities for hospitalizing animals, necessitates our doing good work. Or, to put it otherwise, there is little justification for other than the best work in the handling of small animals. I think it should be the duty of this Section of our national organization to encourage better work in diagnoses. I think there is no excuse whatever for practitioners who do very much small-animal practice failing to employ modern methods in the diagnosis of intestinal disorders. Our surgery should be the very best. It is easy to confine our patients; they lend themselves nicely to the use of anesthetics. I think we should rather lead the way in the development of methods for employing anesthesia of some sort. And so it is, I believe, all the way through. We can, in general, pattern after the work done by physicians, and in hospitalizing

our patients we can, within reason, follow the example that has been set in the hospitalization of human patients.

At the same time I believe we should be cautious in our work, lest we go too far in some of this imitation. We should guard against methods that are questionable and presented largely for the effect on the clientele, such as advertising stunts of various kinds in connection with the employment of remedial agents. Particularly, I think, we should not go too far in the use of that which is untried. A fault is rapidly developing wherein, for instance, light is used for its therapeutic effects. This, however, does not justify the employment of an ordinary red lamp in an ordinary socket for a suffering dog, and this claimed to be a valuable treatment for distemper.

We have considerable work to do, and I shall conclude simply by stating that I hope in years to come this Section will lead, or pave the way, in the work of making progress in the application of diagnostic principles, in the application of therapeutic measures, and everything, in fact, that will tend to promote our interests in general.

Thank you!

The report of the Secretary is next in order.

SECRETARY MILKS: I feel that you men are going to be more interested in the program than in the Secretary's report. I feel that way about it myself and I figure you do too.

I would like to say a word about the program in general and that is just a word to you men. You men have got to supply the program and I hope that the next secretary will be able to get some papers from some of you. That is one way in which you can all help. You will all know in plenty of time who the secretary is, so if you have a paper volunteer to give it. One other thing that I want to say is that if you are asked to give a paper and you do not feel that you can give one, please reply to that effect. It is quite surprising what poor correspondents some men are. We write dozens of letters without receiving even a single reply of any kind.

I want to thank the men who are going to contribute to this program for their cooperation and I think I will have to submit the program as the Secretary's report. Thank you!

The following program was presented:

"Ultraviolet Ray in Small-Animal Practice," Dr. J. C. Flynn.

"Hookworm Infestation in Dogs (Uncinariasis)," Dr. S. W. Haigler.

"Anatomy of the Dog," Dr. J. D. Grossman. (Illustrated with lantern-slides.)

. . . While the Section was awaiting the installation of the lantern for the use of Dr. Grossman, Dr. J. V. Lacroix read a report entitled, "A Manual of Small Animal Hospital Standardization." Dr. J. C. Flynn occupied the Chair while Dr. Lacroix read his report. Following its presentation it was duly moved, seconded and carried that the Section on Small Animal Practice approve the recommendation contained in the report and that same be transmitted to the Executive Board for further action. . . .

. . . It was duly moved, seconded and carried that the discussion of Dr. Grossman's paper be taken up at the following session. The session adjourned at 12:30 p. m. . . .

ADJOURNMENT

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THURSDAY MORNING, August 9, 1928

The second session was called to order at 9:00 o'clock by Dr. J. V. Lacroix, chairman.

The following program was presented:

"Some of the Rarer and More Neglected Parasites of Dogs and Cats," Dr. E. W. Price.

"The Hospitalization of Small Animals," Dr. J. Elliott Crawford.

. . . At this point it was duly moved, seconded and carried to proceed with the election of section officers. . . .

CHAIRMAN LACROIX: The first will be nominations for the office of chairman.

. . . Dr. C. W. Bower, of Topeka, Kansas, was nominated. There being no further nominations a motion prevailed to have the Secretary cast the unanimous ballot of the Section for Dr. Bower as chairman for the ensuing year. . . .

SECRETARY MILKS: I cast the ballot for Dr. Charles W. Bower, as chairman for the ensuing year.

CHAIRMAN LACROIX: Next will be nominations for the office of secretary.

. . . Dr. H. J. Milks was nominated to succeed himself as secretary. There being no further nominations a motion was duly made, seconded and carried that the Chairman be instructed to cast the unanimous vote of the Section for Dr. Milks as secretary. . . .

CHAIRMAN LACROIX: I hereby cast the unanimous vote of the Section for Dr. Milks to succeed himself as secretary of the Section.

We are now ready to proceed with the program.

. . . The program was continued as follows: . . .

"Observations on Canine Distemper," Dr. F. W. Wood.

"Emergencies Following Automobile Injuries to Small Animals," Dr. H. W. Brown. (Read by title.)

DR. H. M. HAMILTON: I move we adjourn.

. . . The motion was duly seconded. . . .

CHAIRMAN LACROIX: All in favor of the motion say "Aye"; contrary, "No." The "Ayes" have it.

. . . The session adjourned at 12:25 p. m. . . .

ADJOURNMENT

## SECTION ON EDUCATION AND RESEARCH

WEDNESDAY MORNING, August 8, 1928

The first session was called to order at 9:25 a. m. by Dr. R. A. Runnells, chairman.

CHAIRMAN RUNNELLS: Secretary Harkins is not able to be with us, he is detained at home on account of the illness of his wife. President Hilty says that it will not be necessary to appoint a secretary *pro tempore*. Dr. Harkins has sent no report, but I am sure that we all appreciate his efforts in getting up this program. Dr. Harkins had eighteen or nineteen papers offered for the program of this Section, but when the Committee on Program met it was found advisable to transfer some of these papers to the other sections.

I have no chairman's address and, as it is getting late, I think we should proceed with the program.

The following program was presented:

"The Only Source of Supply of the Profession," Dr. David S. White.

"The Essentials in Veterinary Education," Dr. George H. Glover.

"The Pathology of Sweet Clover Disease in Cattle," Dr. Lee M. Roderick.

"The Relation of Diet to Disease," Dr. Solon N. Blackberg. (Read by title.)

"The Effects of *Trichostrongylus Axei* in the Stomach of the Horse," Dr. E. W. Price. (Read by title.)

. . . The session adjourned at 12:30 p. m. . . .

ADJOURNMENT

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THURSDAY MORNING, August 9, 1928

The second session was called to order at 9:20 a. m. by Dr. R. A. Runnells, chairman.

The following program was presented:

"Hemorrhagic Septicemia, with Report of One Outbreak in Swine," Drs. M. F. Barnes and A. L. Brueckner. (Read by Dr. Barnes.)

"Further Studies on Enteritis in Swine," Drs. Charles Murray, H. E. Biester, S. H. McNutt and Paul Purwin. (Read by Dr. Murray.)

"Some of the Physico-Chemical Properties of the Virus of Hog Cholera," Dr. H. C. H. Kernkamp.

"Fowl Cholera Studies," Dr. F. R. Beaudette. (Read by title.)

"The Antigenic Value of Formolized Botulinum Toxins," Drs. Robert Graham, E. C. McCulloch and E. A. Tunnicliff. (Read by Dr. Graham.)

CHAIRMAN RUNNELLS: The next in order is the election of officers. We must elect a chairman and a secretary.

. . . Dr. H. E. Biester, of Ames, Iowa, and Dr. M. J. Harkins, of Philadelphia, Pa., were placed in nomination for the office of chairman. A ballot was taken and Dr. Biester was declared elected chairman for the ensuing year. . . .

. . . Dr. W. A. Hagan, of Ithaca, N. Y., was nominated for the office of secretary. There being no further nominations, a motion was duly made, seconded and carried that the Chairman cast the unanimous ballot of the Section for Dr. Hagan as secretary for the ensuing year. Chairman Runnells cast the ballot.

. . .

CHAIRMAN RUNNELLS: There being no further business we stand adjourned.

. . . The session adjourned at 12:15 p. m. . . .

ADJOURNMENT

# ALUMNI MEETINGS AT MINNEAPOLIS

## ALABAMA POLYTECHNIC INSTITUTE

Two veterinary alumni of the Alabama Polytechnic Institute, Dr. B. T. Simms ('11), of Corvallis, Ore., and Dr. R. H. Stewart ('22), of Indianola, Miss., and two members of the faculty, Dr. C. A. Cary (Iowa '85) and Dr. I. S. McAdory (McK. '08), constituted the group which got together at the Andrews Hotel, Minneapolis, Tuesday evening, August 7, 1928, for the purpose of reminiscing and telling stories of college days at Auburn, Alabama. Although the attendance at this meeting was small, it lacked nothing in enthusiasm with Dean Cary as the moving spirit.

## CORNELL UNIVERSITY

Alumni of the New York State Veterinary College at Cornell University, to the number of thirteen, got together for their annual A. V. M. A. gathering in Room 134, of the New Nicollet Hotel, Minneapolis, Tuesday evening, August 7, 1928. The attendance list follows:

Dr. H. J. Milks ('04), Ithaca, N. Y.
Dr. W. W. Dimock ('05), Lexington, Ky.
Dr. J. N. Frost ('07), Ithaca, N. Y.
Dr. F. W. Wood ('07), Berkeley, Calif.
Dr. L. E. Case ('08), Honolulu, Hawaii
Dr. C. P. Fitch ('11), St. Paul, Minn.
Dr. E. M. Pickens ('11), College Park, Md.
Dr. T. O. Brandenberg ('13), Lakota, N. D.
Dr. Frank Breed ('13), Lincoln, Nebr.
Dr. J. B. Latshaw ('16), Caruthersville, Mo.
Dr. W. A. Billings ('18), St. Paul, Minn.
Dr. E. J. Frick ('18), Manhattan, Kans.
Dr. C. B. Cain ('23), A. & M. College, Miss.

A number of other Cornell alumni were in attendance at the meeting, but were unable to get to the dinner. The usual after-dinner discussion of personal, college and professional subjects followed.

H. J. M.

## IOWA STATE COLLEGE

The largest gathering of veterinary alumni of Iowa State College since the Des Moines meeting of the A. V. M. A., in 1924, took place at the New Nicollet Hotel, Tuesday evening, August 7, 1928. Sixteen states were represented and there were 106 alumni in attendance. The large number of graduates of

recent years was a very noticeable feature of the meeting. The following alumni registered at the meeting and, with but a few exceptions, were in attendance at the dinner.

Dr. C. A. Cary ('85), Auburn, Ala.
Dr. G. H. Glover ('85), Fort Collins, Colo.
Dr. W. H. Austin ('91), Gilman, Iowa
Dr. W. B. Lincoln ('93), Nashville, Tenn.
Dr. B. R. Rogers ('99), Chicago, Ill.
Dr. F. E. Parker, ('00), Des Moines, Iowa
Dr. F. R. Ahlers ('01), Lamonte, Iowa
Dr. A. L. Wood ('02), Hampton, Iowa
Dr. Dan Hurst ('02), Sheldon, Iowa
Dr. H. A. McIntire ('02), Maquoketa, Iowa
Dr. W. H. Lytle, ('02), Salem, Oregon
Dr. R. R. Dykstra ('05), Manhattan, Kansas
Dr. K. W. Stouder ('05), Ames, Iowa
Dr. C. H. Stange ('07), Ames, Iowa
Dr. H. E. Breckenbaumer ('08), Sioux City, Iowa
Dr. G. G. Graham ('08), Kansas City, Mo.
Dr. C. E. Hunt ('08), Mount Pleasant, Iowa
Dr. W. C. Smith ('09), Fairfield, Iowa
Dr. H. D. Bergman ('10), Ames, Iowa
Dr. R. Graham ('10), Urbana, Ill.
Dr. B. E. McCulloch ('10), Eagle Grove, Iowa
Dr. A. R. Menary '(10), Cedar Rapids, Iowa
Dr. H. J. Nygren ('10), Waverly, Iowa
Dr. A. W. Sprague ('10), South Omaha, Nebr.
Dr. J. H. Doerr ('11), Melbourne, Iowa
Dr. O. F. Freed ('11), Huxley, Iowa
Dr. A. L. Born ('11), Story City, Iowa.
Dr. R. G. Lovesee ('11), Anoka, Minn.
Dr. L. W. McElyea ('11), Ames, Iowa
Dr. Louis Nelson ('11), Sioux Falls, S. D.
Dr. L. E. Willey ('11), Sioux City, Iowa
Dr. W. R. Laird ('11), Sioux Falls, S. D.
Dr. D. B. Palmer ('11), St. Paul, Minn.
Dr. C. H. Banks ('12), Tipton, Iowa
Dr. B. J. Lattimer ('12), Springfield, Minn.
Dr. Chas. Murray ('12), Ames, Iowa
Dr. G. P. Simmons ('12), Union, Iowa
Dr. John Patterson ('12), Hedrick, Iowa
Dr. C. E. Juhl ('13), Osage, Iowa
Dr. W. E. Macklin ('13), Minneapolis, Minn.
Dr. C. D. Rice, ('13), Ames, Iowa
Dr. C. H. Haggard ('14), Luverne, Minn.
Dr. L. A. White ('14), St. Paul, Minn.
Dr. I. D. Wilson ('14), Blacksburg, Va.
Dr. H. L. McMillan ('15), Estherville, Iowa
Dr. L. D. Potter ('15), Storm Lake, Iowa
Dr. E. L. Fitch ('16), Audubon, Iowa
Dr. L. W. Fox ('16), Algona, Iowa
Dr. T. M. Rossing ('16), Bode, Iowa
Dr. W. A. Aitken ('17), Ames, Iowa
Dr. S. H. McNutt ('17), Ames, Iowa
Dr. C. B. Wilson ('17), Britt, Iowa
Dr. H. C. Fitch ('18), Missouri Valley, Iowa
Dr. H. H. Dukes ('18), Ames, Iowa
Dr. E. A. Hewitt ('18), St. Paul, Minn.
Dr. F. E. Walsh ('18), Ames, Iowa
Dr. H. W. Orr ('18), Stillwater, Okla.
Dr. G. B. Fincham ('18), Sioux City, Iowa

Dr. E. H. Allison ('19), Balstan, Minn.
Dr. J. C. Carey ('19), West Liberty, Iowa
Dr. W. C. Verploeg ('19) Pella, Iowa
Dr. L. M. Hadley ('20), Ruthven, Iowa
Dr. P. V. Neuzil ('20), Blairstown, Iowa
Dr. L. H. Phipps ('20), Winnebago, Minn.
Dr. G. W. Cady ('21), Mason City, Iowa
Dr. H. L. Coffin ('21), Adair, Iowa
Dr. Wm. Dohrer ('21), Ayrshire, Iowa
Dr. Carl Hansen ('21), Faribault, Minn.
Dr. P. L. Stow ('21), Newton, Iowa
Dr. O. G. Wheaton ('21), Naperville, Ill.
Dr. D. A. Eastman ('22), Cedar Rapids, Iowa
Dr. D. L. Halver ('22), Shakopee, Minn.
Dr. George Moses ('22), Amboy, Minn.
Dr. S. Sheahan ('22), Lake Mills, Iowa
Dr. W. M. Moermond ('22), Everly, Iowa
Dr. H. E. Woodward ('22), Wittemore, Iowa
Dr. W. P. Brower ('23), Menno, S. D.
Dr. C. B. McGrath ('23), Onawa, Iowa
Dr. H. C. Smith ('23), Fort Dodge, Iowa
Dr. B. A. Zupp ('23), Waltham, Minn.
Dr. F. A. Bonstetter ('24), Algona, Iowa
Dr. George Blohm ('24), Sioux Falls, S. D.
Dr. A. F. Burger ('24), Alta, Iowa
Dr. L. P. Miller ('24), Buffalo Center, Iowa
Dr. J. R. Scott ('24), Parker, S. D.
Dr. M. A. Emmerson ('25), Ames, Iowa
Dr. H. S. Lames ('25), LaPorte City, Iowa
Dr. A. W. Nyline ('25), Hinckley, Minn.
Dr. R. B. Spearing ('25), Manly, Iowa
Dr. L. E. Stanton ('25), Burt, Iowa
Dr. Ben Anderson ('25), Canton, S. D.
Dr. R. A. Merrill ('26), Clara City, Minn.
Dr. O. Schragg ('26), Freeman, S. D.
Dr. E. J. McCausland ('26), Lake Park, Iowa
Dr. C. A. Hauschen ('26), Brewster, Minn.
Dr. R. H. Arpke ('27), Sheboygan Falls, Wis.
Dr. Glade Chapin ('27), Kasson, Minn.
Dr. D. N. Voetberg ('27), Albia, Iowa
Dr. W. E. Welsh ('27), Hibbing, Minn.
Dr. C. E. Swink ('27), Akron, Ohio
Dr. John Buck ('27), Hills, Minn.
Dr. O. T. Douglas ('27), Galesburg, Ill.
Dr. Louis D. Mersch ('28), Sioux Falls, S. D.
Dr. Russell McNellis ('28), Rouses Point, N. Y.
Dr. John A. Roberts ('28), St. James, Minn.
Dr. Wm. Andrews ('28), Elmore, Minn.

Following the dinner, Dr. H. D. Bergman presided and immediately called upon Dr. W. A. Aitken as yell leader, with very favorable results. Dean C. H. Stange gave an interesting talk on recent progress and developments in the institution as a whole, at Ames, and especially in the Veterinary College, using both moving pictures and lantern-slides. Particularly interesting to the alumni were his description and pictures of the new buildings and laboratories recently completed on the veterinary research farm for carrying on work in the investigation of animal diseases.

Drs. George H. Glover and I. D. Wilson were called upon for brief talks, as was also Dr. J. W. Connaway, of Columbia, Mo., who was the guest of Dr. Robert Graham. Several of the alumni were accompanied by their wives.

Members of the Iowa State College faculty, who are alumni of other institutions, had a busy evening attending the dinners both of their respective alma maters and their adopted institutions. However, all managed to drop in during the evening.

H. D. B.

## KANSAS CITY VETERINARY COLLEGE

As per schedule in the program of the Minneapolis meeting of the A. V. M. A., the Kansas City Veterinary College Alumni Association convened around the festive board at the New Nicollet Hotel, Minneapolis, Tuesday evening, August 7, 1928. This was the largest annual gathering of the Association that has been held in recent years. At the banquet table there were fifty alumni and some forty wives, children and sweethearts. Arrangements for the banquet had been made by Drs. W. L. Boyd ('09) and E. W. Berg ('10), of St. Paul. Following the banquet a short business session was held and the following officers were elected for the ensuing year: President, N. F. Williams ('11), Fort Worth, Texas; Vice-President, Dr. J. L. Jones ('13), Blackburn, Mo.; Secretary-Treasurer and Editor of the *K. C. V. C. Alumni Quarterly*, Dr. A. T. Kinsley ('04), Kansas City, Mo.

It was unanimously agreed that the publication of the *Quarterly* be continued, as it was the most authoritative source of information concerning the activities of alumni. A splendid address was given by Dr. G. A. Roberts ('03), of Lavras, Brazil. Dr. Roberts described the home life and modes of living of the native Brazilians. He also briefly indicated the development of agriculture and veterinary medicine in that country. His address was appreciated by all present.

Of those in attendance, fifteen were from Minnesota, seven from the states of Missouri, Iowa and Nebraska, and the rest were from states extending all the way from California, on the west, to North Carolina, on the east. Dr. William M. Bell, of Nashville, Tenn., was the oldest graduate present, having been a member of the class of 1892.

Dr. A. E. Hoffman ('06), of Detroit Lakes, Minn., was the first graduate of the Kansas City Veterinary College to locate in the Gopher State. In all, sixteen different classes were repre-

sented at the meeting. It was unfortunate that the meeting was held during the early part of the convention. If it had been held later in the week, over 100 alumni would have attended the banquet, because that number registered at the convention.

A. T. K.

## KANSAS STATE AGRICULTURAL COLLEGE

Veterinary alumni of the Kansas State Agricultural College got together at an informal banquet served in Parlor M, of the New Nicollet Hotel, Minneapolis, Tuesday evening, August 7, 1928. The following were in attendance:

Dr. Fred M. Hayes ('08), Davis, Calif.
Dr. J. W. Lumb ('10) and wife, Manhattan, Kansas.
Dr. G. E. Whipple ('11), Omaha, Nebr.
Dr. Chas. W. Bower ('18) and wife, Topeka, Kansas.
Dr. F. K. Hansen ('19), Marquette, Mich.
Dr. M. P. Schlaegel ('20) and wife, Burr Oak, Kansas.
Dr. J. A. Bogue ('21) and wife, Lawrence, Kansas.
Dr. Carl A. Brandley ('23), Manhattan, Kansas.
Dr. F. W. Crawford ('23), S. St. Paul, Minn.
Dr. E. R. Frank ('24), Manhattan, Kansas.
Dr. E. R. Moberg ('25), Dawson, Minn.
Dr. P. R. Carter ('26), Minneapolis, Minn.
Mr. R. W. Jackson ('30), Minneapolis, Minn.

Drs. George A. Young ('12), of Syracuse, Nebr., and W. A. Hagan ('15), of Ithaca, N. Y., were in attendance at the convention, but were unable to be present at the K. S. A. C. banquet.

After an unusually well-prepared and well-served dinner, brief responses to toasts were made by Mrs. J. W. Lumb, for the ladies; Dr. F. M. Hayes, for the research workers; Dr. G. E. Whipple, for the serum manufacturers; Dr. F. K. Hansen, for state sanitary workers; Dr. M. P. Schlaegel, for the practitioners; Dr. F. W. Crawford, for the U. S. Bureau of Animal Industry; and Dr. P. R. Carter, as the most recent graduate, spoke for work in connection with a state health department.

Taken as a whole the affair was a very enjoyable one and indicated at least two things:

1. The large variety of vocations in which veterinary graduates of the Kansas State Agricultural College are engaged.
2. The loyalty of K. S. A. C. graduates as evidenced by a 100 per cent attendance of those not otherwise engaged.

R. R. D.

## MICHIGAN STATE COLLEGE

At the call of Dr. H. K. Wright, of Philadelphia, Pa., the Michigan State College veterinary alumni in attendance at the

Minneapolis meeting of the A. V. M. A. turned out 100 per cent. The address of the meeting place will be furnished on request; also the per cent. The roll-call of alumni, faculty and guests is as follows:

Dr. L. H. Wileden ('13), Mason, Mich.
Dr. H. K. Wright ('15), Philadelphia, Pa.
Dr. R. A. Runnels ('16), Blacksburg, Va.
Dr. H. J. Stafseth ('17), East Lansing, Mich.
Dr. K. B. Hanson ('19), Saratoga Springs, N. Y.
Dr. L. J. Heiden ('23), Escanaba, Mich.
Dr. H. J. Fiege ('25), Kenosha, Wis.
Dr. I. F. Huddleson ('25), East Lansing, Mich.
Dr. J. S. Matteson ('25), Parnell, Mo.
Dr. W. Giltner (Corn. '06), East Lansing, Mich.
Dr. W. L. Chandler, East Lansing, Mich.
Mr. W. L. Mallmann, East Lansing, Mich.
Dr. R. E.fShigley (Chi. '09), Kenmare, N. D.
Dr. B. J. Killham (McK. '12), Lansing, Mich.
Dr. H. L. Delez (Colo. '25), St. Paul, Minn.

W. G.

## OHIO STATE UNIVERSITY

Under arrangements made by Drs. H. C. H. Kernkamp and R. Fenstermacher, the alumni of the College of Veterinary Medicine, Ohio State University, had a very enjoyable evening in Parlors O-P, of the New Nicollet Hotel, Tuesday evening, August 7, 1928. in the form of a banquet, with Dean David S. White as master of ceremonies. As time was limited, everyone present was not asked to make an address, nevertheless the following were permitted to make a few remarks:

Mrs. H. C. H. Kernkamp (for the ladies), Drs. C. H. Hays, H. M. Newton, R. P. Marsteller, H. E. Pinkerton, S. J. Alcalay, Jas. D. Grossman, C. C. Palmer and H. C. H. Kernkamp. Dr. Reuben Hilty was called upon, but he had to leave the room before the speech-making got under way. The following list shows those who were present at the banquet. Many other alumni were in attendance at the meeting during the week.

Dr. David S. White ('90) and wife, Columbus, Ohio
Dr. C. C. Lipp ('03) and wife, Brookings, S. D.
Dr. C. H. Case ('04), wife and son, Akron, Ohio
Dr. L. W. Goss ('05), Columbus, Ohio.
Dr. R. P. Marsteller ('05), College Station, Tex.
Dr. H. M. Newton ('05), Charleston, W. Va.
Dr. H. E. Pinkerton ('05), Lincoln, Nebr.
Dr. F. A. Imler ('06), Kansas City, Mo.
Dr. Reuben Hilty ('07) and wife, Toledo, Ohio.
Dr. H. H. Fairbank ('08), Columbus, Ohio
Dr. C. H. Hays ('08), Lincoln, Nebr.
Dr. G. S. Weaver ('08) and wife, Brookings, S. D.
Dr. J. O. Wilson ('08), Pierre S. D.
Dr. Harry Evenson ('09) and wife, Sacred Heart, Minn.
Dr. T. J. Foster ('09), Monticello, Ill.

Dr. H. D. Larzelere ('09), Janesville, Wis.
Dr. Albert Goodlive ('10), Marshall, Mo.
Dr. S. J. Alcalay ('11), Minneapolis, Minn.
Dr. C. H. Covault ('11), Ames, Iowa.
Dr. A. S. Schlingman ('11), Detroit, Mich.
Dr. C. A. Fast ('12) and wife, Van Wert, Ohio.
Dr. W. F. Guard ('12) and wife, Ames, Iowa.
Dr. C. C. Palmer ('12) and wife, Newark, Del.
Dr. W. A. Barnette ('13), Greenwood, S. C.
Dr. H. Lothe ('13), Waukesha, Wis.
Dr. Irvin Myers ('13) and wife, Portal, N. D.
Dr. J. C. Schoenlaub ('13), Indianapolis, Ind.
Dr. H. L. Foust ('14), Ames, Iowa.
Dr. Jas. D. Grossman ('14), wife and son, Columbus, Ohio.
Dr. H. C. H. Kernkamp ('14) and wife, St. Paul, Minn.
Dr. H. P. Lefler ('15), Fort Dodge, Iowa
Dr. Lee M. Roderick ('15), Fargo, N. D.
Dr. W. F. Joseph ('16), Iroquois, S. D.
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Dr. Fred Low ('17), Oakes, N. D.
Dr. Geo. S. Place ('17) and wife, St. Marys, Ohio.
Dr. O. I. Catlin ('18), Moorhead, Minn.
Dr. H. P. Roberts ('18), Fargo, N. D.
Dr. R. S. Smiley ('19) and wife, Cromers, Ohio.
Dr. L. C. Morgan ('20), Greenfield, Ind.
Dr. E. E. Sweebe ('20), N. Chicago, Ill.
Dr. Peter McKenzie ('21), Aneta, N. D.
Dr. A. W. Munson ('22), Bismarck, N. D.
Dr. L. R. Tweete ('22), Thief River Falls, Minn.
Dr. Lewis H. Moe ('27), Stillwater, Okla.

## ONTARIO VETERINARY COLLEGE

The graduates of the Ontario Veterinary College in attendance at the Minneapolis meeting of the A. V. M. A. held their alumni dinner at the New Nicollet Hotel, Tuesday evening, August 7, 1928. There was a good attendance of members and their wives, there being in the neighborhood of 35 present. A very enjoyable time was spent in renewing old friendships and forming new acquaintances with the younger members. Dr. L. A. Merillat presided in his usual capable and genial manner. Dr. E. A. Watson, who has for several years acted as treasurer of the Andrew Smith Memorial Fund, reported that the Fund had now reached a substantial amount and recommended that some definite action be taken in connection with the objects of the Fund. Those taking part in the discussion included Drs. J. I. Gibson, L. E. Day, L. A. Merillat, J. W. Griffith, P. Malcolm and C. D. McGilvray. It was then unanimously agreed that use should now be made of the interest annually accruing on the Fund, and Drs. Merillat, Watson and McGilvray were appointed a special committee to arrange for the procurement of a suitable design for a gold medal, bearing a bust of the late Dr. Andrew

Smith, and to arrange for the annual award of this medal to the student having the best standing at graduation from the Ontario Veterinary College.

The following were in attendance at the dinner:

Dr. J. I. Gibson ('87) and wife, St. Joseph, Mo.
Dr. L. A. Merillat ('88), Evanston, Ill.
Dr. J. W. Elliott ('90) and wife, Aberdeen, S. D.
Dr. P. Malcolm ('90) and wife, Des Moines, Iowa.
Dr. J. H. Spence ('90) and wife, Clinton, Iowa.
Dr. W. F. Crewe ('91), Bismarck, N. D.
Dr. L. Enos Day ('92), Chicago, Ill.
Dr. John W. Griffith ('92), Cedar Rapids, Iowa.
Dr. Fred Evans ('93), wife and daughter, Sioux Falls, S. D.
Dr. M. J. Kellam ('93), Winnipeg, Man.
Dr. H. C. Peters ('96), Litchfield, Minn.
Dr. J. P. Foster ('00), Minneapolis, Minn.
Dr. C. D. McGilvray ('00), Guelph, Ont.
Dr. C. A. Mack ('01), Forest Lake, Minn.
Dr. W. A. Henderson ('02) and wife, Stratford, Ont.
Dr. J. A. McLeish ('02), Montreal, Que.
Dr. E. A. Watson ('04), Hull, Que.
Dr. S. S. Westgate ('06), Grafton, N. D.
Dr. F. C. Bornschein ('13), wife and son, Moville, Iowa.
Dr. H. E. Ash ('15), Bowling Green, Ohio.
Dr. John N. Campbell ('15), Truman, Minn.

## UNIVERSITY OF PENNSYLVANIA

Graduates of the University of Pennsylvania in attendance at the Minneapolis meeting of the A. V. M. A. gathered in Parlor Q at the New Nicollet Hotel, Tuesday evening, August 7, 1928, for their annual get-together. The attendance list follows:

Dr. C. E. Cotton ('93), Minneapolis, Minn.
Dr. H. W. Turner ('93), New Hope, Pa.
Dr. C. J. Marshall ('94), Philadelphia, Pa.
Dr. J. R. Mohler ('96), Washington, D. C.
Dr. J. T. Hernsheim ('97), Chicago, Ill.
Dr. L. A. Klein ('97), Philadelphia, Pa.
Dr. M. Jacob ('99), Knoxville, Tenn.
Dr. E. L. Cornman ('00), Marietta, Pa.
Dr. O. M. Norton ('01), Greenville, Miss.
Dr. C. S. Shore ('01), Lake City, Minn.
Dr. B. T. Woodward ('02), New York, N. Y.
Dr. E. P. Althouse ('03), Sunbury, Pa.
Dr. Geo. H. Hart ('03), Davis, Calif.
Dr. Henry Hell ('04), Wilton Junction, Iowa.
Dr. T. E. Munce ('04), Harrisburg, Pa.
Dr. Wm. C. Prouse ('07), Minneapolis, Minn.
Dr. H. Preston Hoskins ('10), Detroit, Mich.
Dr. W. H. Ivens ('10), Philadelphia, Pa.
Dr. M. F. Barnes ('11), Harrisburg, Pa.
Dr. A. A. Feist ('12), St. Paul, Minn.
Dr. E. F. Ahnert ('13), Omaha, Nebr.
Dr. J. T. E. Dinwoodie ('13), Aberdeen, S. Dak.
Dr. C. H. Hofstrand ('13), Churchs Ferry, N. Dak.
Dr. E. A. Benbrook ('14), Ames, Iowa.

Dr. F. H. Kelly ('18), Goldfield, Iowa.
Dr. H. E. Beister ('19), Ames, Iowa.
Dr. H. E. Moskey ('20), Washington, D. C.

Dean Klein reported upon the happenings of the past year at Old Penn, as well as the outlook for the new year, which was very encouraging in all respects. Dr. John T. E. Dinwoodie, live stock editor of the *Dakota Farmer*, spoke interestingly of his contacts with and observations on the veterinary profession in the role of editor of an agricultural paper. Drs. Jacob and Hoskins rendered interesting case reports in the field of bovine obstetrics, much to the amusement of those present.

Dr. Geo. H. Hart delivered an extremely comprehensive and very scholarly dissertation, entitled, "Modern Views on the Proper Relations which Should Exist Between Teaching and Research in Our Great Educational Institutions, with Special Reference to Animal Husbandry." Dr. Hart had evidently spent a great amount of time in the preparation of his address and his audience showed their deep appreciation by their rapt attention during the entire thirty minutes required to deliver the discourse.

A novel stunt was pulled off in the exchange of felicitations between the Ohio State and Pennsylvania alumni groups, who occupied adjoining rooms. Dr. H. C. H. ("Bud") Kernkamp acted as ambassador extraordinary from Ohio to Pennsylvania and Dr. H. W. ("Hen") Turner capably filled the role of minister plenipotentiary from Pennsylvania to Ohio, much to the enjoyment of both groups.

## UNITED STATES COLLEGE OF VETERINARY SURGEONS

Four graduates of the United States College of Veterinary Surgeons got together for dinner at the Nicollet Hotel, Minneapolis, Alumni Night, August 7, 1928.

Dr. C. L. Hall ('10), St. Paul, Minn.
Dr. William Moore ('11), Raleigh, N. C.
Dr. J. N. Holzer ('12), Minneapolis, Minn.
Dr. H. C. Givens ('13), Richmond, Va.

### Horse Laugh

Said the tractor to the horse,
"I was stricken with remorse
As I pulled the plow today,
Thinking how I now enjoy
Doing what was your employ—"
But the nag just laughed, "Neigh, Neigh!"

—*Farm and Fireside.*

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## 1928-1929

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Ohio.....F. A. Lambert, c/o Columbus Serum Co., Sta. C, Box 53, Columbus.
Oklahoma.....C. R. Walter, 538 S. Madison, Tulsa.
Oregon.....W. H. Lytle, Salem.
Pennsylvania.....G. A. Dick, 39th St. & Woodland Ave., Philadelphia.
Rhode Island.....J. S. Barber, 14 Washington St., Central Falls.
South Carolina....M. R. Blackstock, 157 Hampton Ave., Spartansburg.
South Dakota.....C. C. Lipp, Brookings.
Tennessee.....W. B. Lincoln, 3421 Love Circle, Nashville.
Texas.....N. F. Williams, 701 Wheat Bldg., Fort Worth.
Utah.....H. J. Frederick, Logan.
Vermont.....L. H. Adams, State House, Montpelier.
Virginia.....H. C. Givens, 1102 State Office Bldg., Richmond.
Washington.....Earl E. Wegner, College Station, Pullman.
West Virginia.....S. E. Hershey, Box 283, Charleston.
Wisconsin.....J. S. Healy, 110 E. Washington Ave., Madison.
Wyoming.....Cecil Elder, University of Wyoming, Laramie.

RESIDENT PROVINCIAL SECRETARIES

Alberta.....J. C. Hargrave, Medicine Hat.
British Columbia..J. G. Jervis, Milner.
Manitoba.....Alfred Savage, Manitoba Agricultural College, Winnipeg.

New Brunswick....Adam T. McLean, W. Market St., Moncton.
Nova Scotia.....J. Steen, Customs Bldg., Halifax.
Ontario.....R. A. McIntosh, Ontario Vet. College, Guelph.
Prince Edw. Isl'd...W. H. Pethick, Charlottetown.
Quebec.....A. A. Etienne, 1225 Drummond St., Montreal.
Saskatchewan.....R. G. Chasmar, Hanley.

RESIDENT TERRITORIAL SECRETARIES

Alaska.....B. C. Parker, Afognak, Whale Island.
Canal Zone.....Lt. Col. Robt. J. Foster, Corozal.
Hawaii.....L. E. Case, Box 296, Honolulu.
Philippine Islands..Stanton Youngberg, Bureau of Agriculture, Manila.

FOREIGN CORRESPONDING SECRETARIES

Argentina.....Carlos Lloveras, Viamonte 1430, Buenos Aires.
Brazil.....G. A. Roberts, Agricultural School, Lavras, Minas.
Cuba.....B. Crespo, Apartado No. 2518, Havana.
Egypt.....J. E. Aghion, Bey, 6 Midan Soliman Pacha, Cairo.
England.....R. W. Tuck, c/o American Consulate, 18 Cavendish Sq., London, W. 1.
Haiti.....I. B. Boughton, Service Technique, Port au Prince.
Hungary.....Alex. Kotlan, Hungarian Vet. College, Budapest VII.
Mexico.....L. Santa Maria, Apartado Postal 2067, Mexico D. F.
Peru.....J. F. Mitchell, c/o Cerro de Pasco Copper Corp., Oroya.
St. Kitts.....Ernest F. Jardine, Box 18, Basseterre.
Scotland.....A. W. Whitehouse, Glasgow Vet. College, 83 Buccleuch St., Glasgow.

WOMEN'S AUXILIARY TO THE A. V. M. A.

Mrs. Peter Malcolm, President, Des Moines, Iowa.
Mrs. Arthur Spitz, 1st Vice-President, 5443 Arlington St., Philadelphia, Pa.
Mrs. Hamlet Moore, 2nd Vice-President, 622 N. Rampart St., New Orleans, La.
Mrs. H. D. Bergman, 3rd Vice-President, Ames, Iowa.
Mrs. C. P. Fitch, 4th Vice-President, St. Paul, Minn.
Mrs. H. P. Hoskins, Treasurer, 15123 Rosemont Blvd., Detroit, Mich.
Mrs. R. P. Marsteller, Loan Fund Secretary, College Station, Tex.
Mrs. S. E. Hershey, Corresponding Secretary, Box 283, Charleston, W. Va.

## MADRID VETERINARY SCHOOL

The *Journal* of the American Medical Association states that in the report of the recent meeting of the building committee of the "University City," the secretary, Don Florestan Aguilar, announced that the bull fight held lately in Madrid for the benefit of the "University City" had cleared 47,500 pesetas. He announced, also, that it has been agreed to include the veterinary school among the buildings of the city. It was agreed that a committee composed of a professor of the veterinary school and an architect should visit the veterinary schools of Leipzig and Munich to collect fundamental principles to be used in the school of Madrid. Those German veterinary schools are considered by the committee to be the best in the world.—*Science.*

It is estimated that domestic fowls in the United States consume more wheat than is exported from the country.

# ASSOCIATION MEETINGS

## VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY

The regular monthly meeting of the Veterinary Medical Association of New York City was held at the Academy of Medicine Building, 103rd St. and Fifth Ave., New York City, May 2, 1928. The meeting was called to order by the President, Dr. C. G. Rohrer. The minutes of the March meeting were read and approved. The Secretary reported on the smoker held at Keen's English Chop House, instead of the April meeting. There was no literary program, the whole evening being devoted to business.

Dr. H. K. Miller opened the meeting by bringing up the following questions for discussion by the Association:

1. Ear-cropping.
2. Advertising in the Red Book.
3. Grading of hospitals.
4. Societies.

The President suggested that the subjects be discussed in the order as suggested by Dr. Miller.

*Ear-cropping:* The discussion of this subject was all one-sided. The Association unanimously agreed it inhuman to crop ears. It was moved by Dr. O. E. McKim that a committee of three be appointed by the Chair to wait on the authorities at Albany to assist in the formulation of a bill to prohibit ear-cropping. Seconded and so ordered.

*Advertising in the Red Book:* Dr. H. K. Miller suggested that the funds used for advertising in the Red Book be used to finance veterinary education talks by radio. Dr. R. W. Gannett reported on the Brooklyn veterinarians' attempt to adjust advertising in the Red Book by agreeing the cost should not be over $75.00. Dr. A. Slawson suggested a "combination" advertisement. Dr. Gannett moved that a committee be appointed to study the advertising situation in the Red Book. Seconded and ordered.

It was now approaching the closing hour and, therefore, the discussion on "Grading of Hospitals" and "Societies" had to be deferred to a later meeting.

The President appointed the following committees: (1) Ear-cropping: Dr. E. R. Blamey, Dr. H. K. Miller and Dr. O. E. McKim. (2) Red Book Advertising: Dr. A. Slawson, C. P. Zepp and another member to be selected.

Dr. Crawford announced the dates of July 11 and 12 for the New York State Veterinary Medical Society meeting to be held at Coney Island.

Dr. G. A. Knapp, of Millbrook, N. Y., was a welcome visitor. Mr. A. C. Goerlich, of Goerlich and Goerlich, gave a short talk explaining liability insurance and rates to veterinarians.

No further business the meeting adjourned.

### June Meeting

Instead of the regular monthly meeting, there was a combined meeting of the Long Island Veterinary Society, the Brooklyn Veterinary Society and the Veterinary Medical Association of New York City at Berns' Veterinary Hospital, 59 Lawrence St., Brooklyn, N. Y., June 13, 1928. The meeting was called to order by Dr. C. G. Rohrer, president of the Veterinary Medical Society of New York City.

The speaker for the evening was Dr. Edwin Blamey, of New York City, who gave a talk on unusual cases encountered by small-animal practitioners. Among the interesting cases Dr. Blamey presented was one of a Bassett Hound bitch showing prolapse of the rectum, but upon further examination he found it to be intussusception of the small intestines and inversion of the cecum. Treatment: Reduced intussusception and amputated cecum. Bitch recovered very well and at the same time was carrying eight fetuses.

Some of the other cases were adhesion of cecum to colon; calculi in a bitch, where he operated and removed a number of calculi. The stones continued to be formed and later she passed one. Dr. Blamey suggested treating the kidney condition and they would not recur. Another was an Irish Setter which would vomit about two hours after eating and have acute pain. Final examination revealed it to be an ulcer of the duodenum. In this case Dr. Blamey outlined a very exact and scientific system of diagnosis and treatment through a long period of time until the dog was back to normal health. Dr. Blamey explained that vomiting in Bostons is frequently due to hyperacidity of the stomach. He suggested putting them on a non-acid diet until corrected. Irritation in the eyes of Pekingese is usually due to a

double row of eye lashes. Dr. Blamey suggested that these be removed.

Dr. Blamey's paper was discussed by a large number of veterinarians present, including Drs. Baizler, Chase, Miller, Slawson, Crawford, MacKellar, Rohrer, Goodman, Risley and a number of others. From the questions asked Dr. Blamey and the interest taken in the discussion, one could readily assume it presented many interesting points.

Dr. MacKellar reported on the meeting of the Executive Board of the A. V. M. A., assuring everybody a very good program.

No further business, the meeting adjourned.

C. P. ZEPP, *Secretary.*

## FLORIDA STATE VETERINARY MEDICAL ASSOCIATION

The midsummer meeting of the Florida State Veterinary Medical Association was held in the Mirasol Hotel, Davis Islands, Tampa, July 23-24, 1928. The meeting was well attended and the program was carried out in a very able manner.

The meeting was called to order by President F. G. Martin, of Lakeland. Dr. H. M. Clarvoe, of Tampa, gave an address of welcome to Tampa. Dr. C. M. Pollard, of Jacksonville, gave the response to the address of welcome.

Dr. J. G. Fish, Jr., of Jacksonville, gave a discussion on "Municipal Inspection Work." Dr. J. V. Knapp, State Veterinarian, Tallahassee, discussed "Rules and Regulations Governing Interstate Shipment of Cattle from the Tick-Infested Areas of Florida."

Monday afternoon the following program was carried out:

Round-table discussion on diseases of cattle, conducted by Dr. M. J. Ernest, of Tampa.

"Bacillary White Diarrhea in Poultry," by Dr. D. C. Gillis, of Tallahassee.

"Avian Coccidiosis," by Dr. E. F. Thomas, Agricultural Experiment Station, Gainesville.

On Tuesday morning, the session was opened with a discussion of "Municipal Meat Inspection Work," by Dr. Paul Fischer, City Veterinarian of Lakeland.

Following Dr. Fischer's discussion, Dr. W. J. Tanner, of St. Petersburg, gave a paper on "Canine Distemper." Then a round-table discussion on diseases of small animals followed

and Dr. Thos. J. Mahaffy, of Jacksonville, conducted this discussion. The last topic on the program was "Importance of Laboratory Examinations in Making Diagnoses—Practical Demonstrations of Laboratory Specimens," by Dr. J. F. Schubert, of St. Petersburg.

Miami was voted as the next meeting place.

A. L. SHEALY, *Secretary.*

## SOUTH CAROLINA ASSOCIATION OF VETERINARIANS

The nineteenth annual meeting of the South Carolina Association of Veterinarians was held at Columbia, July 24-25, 1928. Headquarters were at the Jefferson Hotel. A large and enthusiastic number of veterinarians attended and the meeting was a success in every way. A number of very interesting papers were read and discussed. These afforded valuable information to all present. A pleasant feature of the meeting was the barbecue held at the Shrine Country Club. This was attended by a large number of ladies. The barbecue was followed by swimming and dancing.

M. R. BLACKSTOCK, *Sec.-Treas.*

## VIRGINIA STATE VETERINARY MEDICAL ASSOCIATION

The thirty-fifth semi-annual meeting of the Virginia State Veterinary Medical Association was held at the Virginia Polytechnic Institute, Blacksburg, July 31-August 1, 1928. Thirty-five members were in attendance. Twelve of them were accompanied by their wives.

The minutes of the annual meeting and of the special meeting, having been sent to all members, a motion prevailed to dispense with the reading of these minutes. President H. C. Givens introduced Dr. J. A. Burruss, president of the Virginia Polytechnic Institute, who made a very pleasant address of welcome. This was responded to by Dr. George C. Faville.

The subject of hemorrhagic septicemia was informally discussed by Drs. McCoy, Neff, Clemmer and others. Each gave reports of outbreaks with which they had had to deal.

Dean H. L. Price, of the College of Agriculture, gave a most interesting talk, entitled, "Coat Color Inheritance in Setter Dogs." Dean Price's talk was based upon a great deal of study

of pedigrees, as well as experience in breeding dogs, and his conclusions were both interesting and instructive.

Dr. Thomas Owen, of Norfolk, discussed "Diseases of Hogs Other Than Cholera." Dr. O. F. Foley, of Bridgewater, read a very comprehensive paper on "Parasites in Swine."

The evening session was called to order at seven o'clock in the Auditorium of the Y. M. C. A. Building. Professor John R. Hutcheson spoke on "The Need for Well-Trained Veterinarians in Virginia." Prof. Hutcheson knows the need for such men and the need for cooperation between the county agent and the veterinarian. He does not want the county agent to practice veterinary medicine, but rather to aid the veterinarian to meet the needs of the farmer.

Professor C. W. Holdaway, of the Virginia Polytechnic Institute, read a very interesting paper on "Mineral Feeding in Animal Nutrition." He showed that there is much misconception in the use of minerals in nutrition and inference could plainly be seen that there is a good chance for fake mineral foods.

Dr. L. E. Starr, of the Virginia Polytechnic Institute, briefly described the methods to be employed in preparing blood samples for the laboratory.

At the business session, a report was received from the Board of Censors, which met immediately after the afternoon session the previous day. It was the opinion of the Board that the office of secretary-treasurer should be separated and it was moved that a resolution to this effect be introduced by Dr. Faville at the annual meeting, the resolution to define separate duties for the offices of secretary and treasurer. It was moved that the resolution introduced at the annual meeting by Dr. McDonough to do away with the semi-annual meeting be not adopted. This resolution was laid over until the annual meeting. Dr. T. P. Rowe was admitted to membership.

At the morning session, the second day, the Association adopted a resolution of condolence on the death of Dr. John S. Nicholas, of Charlotteville.

Dr. E. W. Price, of the U. S. Bureau of Animal Industry, presented a very interesting paper on "Newer Parasites Found in the South." This paper was full of very valuable information and this will be of great value to the profession.

On motion the Association extended to the college authorities

and to the Local Committee on Arrangements a rising vote of thanks for the entertainment arranged for the Association.

At ten o'clock the meeting adjourned to the shade of the oak tree back of Agricultural Hall and enjoyed a large-animal clinic conducted by Dr. J. P. Hutton, of Michigan State College. Dr. Hutton is very skillful with the knife and his work on large animals was greatly enjoyed. Dr. Herbert Howard demonstrated caudal anesthesia in the cow and Dr. J. T. Wilson performed a spaying operation under spinal anesthesia.

At two o'clock, all the members and the ladies went on an automobile ride to Mountain Lake where they enjoyed a basket picnic. This trip was one of the high spots of the meeting. The meeting as a whole was one of the best in the history of the Association and hearty good fellowship and enthusiasm was enjoyed by everyone.

GEORGE C. FAVILLE, *Secretary pro tem.*

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## MONTANA VETERINARY MEDICAL ASSOCIATION

The twentieth annual meeting of the Montana Veterinary Medical Association was held at Helena, August 3-4, 1928. There was a good attendance of veterinarians and their families and an optimistic spirit prevailed. In connection with the meeting, there was a conference of all federal veterinarians in the State, and a meeting of all veterinarians employed by the State.

The first day of the meeting was devoted to a business session in the morning and a program of papers in the afternoon. In the evening a dinner for the members and their wives was served at the Montana Club. The morning of the second day was occupied by a clinic. In the afternoon the business was completed and then the Association was entertained by Dr. W. J. Butler, at his summer camp.

The opening address was made by Dr. W. F. Cogswell, secretary of the Montana State Board of Health, who emphasized the close cooperation between the Board of Health and the Livestock Sanitary Board. The retiring president, Dr. N. B. Smith, spoke on the meat and milk inspection ordinances of Billings, where Dr. Smith is a member of the City Council.

Dr. W. E. Logan, of Billings, gave a talk on some interesting historical data in connection with the development of medical

practice. Dr. H. F. Wilkins, of Lewistown, read a paper on "Foot Rot in Sheep."

Dr. R. R. Spencer, Medical Officer in Charge of the Spotted Fever Laboratory, at Hamilton, Montana, addressed the Association on "Tick-Borne Infections of the Northwest Common to Man and Beast." He discussed particularly spotted fever, tularemia, tick paralysis and the condition known as "down with ticks."

Dr. H. B. Raffensperger, in charge of the Zoological Laboratory of the U. S. Range Live Stock Experiment Station at Miles City, Mont., spoke on "Internal Parasites of Domestic Animals." Dr. E. E. Wegner, dean of the College of Veterinary Medicine, State College of Washington, spoke on "Foreign Bodies in the Bovine," describing a new operation for removal of foreign bodies penetrating the reticulum. At the clinic Dr. Wegner demonstrated catheterization of the bovine male.

Dr. Erwin Jungherr, of the Montana State College, demonstrated the diagnosis of the condition of the genital organs in the cow. Dr. Jungherr also demonstrated the method of examining the gastro-intestinal tract of sheep for parasites.

Dr. Howard Welch, of the Montana State College, demonstrated the proper technic for making postmortem examinations of large animals. Dr. A. E. Evans, U. S. inspector-in-charge of meat inspection at Butte, demonstrated the postmortem examination of a tuberculin reactor.

At the closing business session, Dr. J. W. Kilpatrick, of Hamilton, was elected president for the coming year. Dr. I. W. Vinsel, of Baker, was elected vice-president and Dr. H. Marsh, of Helena, was re-elected secretary-treasurer. Dr. J. W. Murdoch, of Helena, was elected to fill a vacancy on the Executive Board. Missoula was selected as the meeting place for 1929.

HADLEIGH MARSH, *Secretary.*

## HUDSON VALLEY VETERINARY MEDICAL SOCIETY

The regular quarterly meeting of the Hudson Valley Veterinary Medical Society was held at Kenozia Lake, N. Y., August 8, 1928. About fifty were in attendance.

The principal speaker was Dr. M. J. King, Director, Research Laboratory, Metropolitan Life Insurance Company, Mount McGregor, N. Y., who discussed contagious abortion in cattle and its relation to undulant fever in man. Dr. King reported some

interesting results from the examination of patients under his supervision. By making agglutination tests he found that thirteen per cent of the inmates of the institution reacted and examination of the herd of cattle supplying milk to these patients showed a high percentage of reactors. The number of cows actually eliminating *B. abortus* in the milk, however, was less than one-half of the total reacting. One animal eliminating the organism failed to react to the test. Dr. King stated that this observation had also been made by other investigators. He also reported that after pasteurization of the milk was begun no new reactors had been found among the inmates. This result also had been reported by other workers.

In the opinion of Dr. King, the pasteurization of the milk was necessary for the protection of the human consumer and raw milk produced even under the most elaborate sanitary surroundings did not offer full protection. Several cases of undulant fever were cited and in some of these a diagnosis of tuberculosis, typhoid fever, or some other disease had been made first. The history of every case indicated that the patient had taken milk from herds where abortion disease had existed, or where cows had later been found to be harboring *B. abortus* infection.

Dr. King discussed the difference between *B. abortus* and *B. melitensis* and their respective cultural characteristics. He explained the necessity of animal inoculation to differentiate between the two organisms and the difficulty in some instances of clearly determining to which type the organism belonged. Reference was made of the danger to laboratory workers and several instances of accidental infection were mentioned. Variations in test results were discussed and the opinion was expressed that there was much work yet to be done in standardizing methods and procedure. Dr. King reported that vaccination of cattle using living organisms had proven beneficial, in his opinion.

A spirited discussion of this subject followed and questions also were asked relative to the B. C. G. treatment for tuberculosis. Dr. King showed his familiarity with this subject and gave some valuable and interesting data. President McCartney then expressed his appreciation, as well as that of the Society, to Dr. King for the valuable and interesting contribution he had made to the knowledge of those present and a rising vote of thanks was given for the excellent address he had delivered.

J. G. WILLS, *Sec.-Treas.*

## NORTHEASTERN PENNSYLVANIA VETERINARY MEDICAL CLUB

The regular bi-monthly meeting of the Northeastern Pennsylvania Veterinary Medical Club was held on August 23, 1928, at the Montrose Beef Company, Pittston, at which time the members were the guests of the above concern, who furnished a beefsteak dinner at the American Legion Building, West Pittston. The dinner was served by Mrs. John Stutz in a very elaborate manner. After dinner, the ladies were entertained by Mrs. D. O'Shea, wife of the president of the Montrose Beef Company, while the veterinarians motored to the abattoir of the concern and held their regular meeting and received a talk from Dr. M. J. Harkins, of the Veterinary Department of the University of Pennsylvania, on "Immunology and Chemotherapy of Some of the Common Infectious Diseases." Dr. S. E. Bruner, who is in charge of tuberculosis eradication, for the Pennsylvania Bureau of Animal Industry, also gave a very interesting discourse. These talks were instructive to all present. Other veterinarians from the Pennsylvania Bureau of Animal Industry also joined the discussion.

T. D. JAMES, *Secretary.*

## McLEAN COUNTY VETERINARY MEDICAL ASSOCIATION

The summer meeting of the McLean County (Ill.) Veterinary Medical Association was held at Miller Park, Bloomington, July 20, 1928. The program consisted of the following papers and addresses:

"Overheat vs. Sunstroke," Dr. N. I. Stringer, Wenona.
"Canadian Thistle-Spray Poisoning," Dr. C. B. White, Stanford.
"Rabies," Dr. E. M. Marquadt, Bloomington.
"The Newer Problems of Our Laboratories," Dr. Robert Graham, Urbana.

A picnic dinner for the members and their families followed the meeting.

## PERSONALS

Dr. George Gordon (Chi. '14) has opened a new veterinary hospital at 8210 South Ashland Ave., Englewood, Illinois. It is reported that the new hospital represents an investment of $35,000.

Dr. Peter Garside (Chi. '10), of Bourbon, Ind., has gone south for his customary annual sojourn. Dr. Garside will be located at 237 S. Grandview Ave., Daytona Beach, Florida, during the winter months.

Dr. C. L. Woolard (Chi. '17), of Benton, Ill., has been engaged as Montgomery County (Ill.) Veterinarian by the Board of Supervisors at a salary of $3,600 per year, with an allowance of $400 for the expenses of his office.

# NECROLOGY

## WILLIAM SHEPPARD

Dr. William Sheppard, of Orlando, Florida, died at his home, August 25, 1928, after an illness extending back over a year.

Born in England, 79 years ago, Dr. Sheppard was a graduate of the Royal College of Veterinary Surgeons, London. For many years he practiced at Sheepshead Bay, Brooklyn, N. Y., and was prominent in Thoroughbred and racing circles. While firing a horse, about twenty years ago, Dr. Sheppard received a kick, which affected the auditory nerves and finally resulted in almost total deafness. He removed to Florida about five years ago.

Dr. Sheppard joined the A. V. M. A. in 1907. He is survived by his widow and one brother.

## JOHN CHARLES GENSBURG

Dr. John C. Gensburg, of Pittsburgh, Pa., aged 34 years, died in Passavant Hospital, Pittsburgh, August 31, 1928, after an illness of ten days, the result of a streptococcic infection of the nose and face. Dr. Gensburg started his veterinary studies at Michigan State College and finished at Ohio State University in 1920. He established a very lucrative small-animal practice in Pittsburgh. Dr. Gensburg's will provided that his veterinary library and instruments go to the Ohio State University. His parents and four brothers survive.

J. A. W.

## GEORGE WILLIAM CLARK

Dr. George W. Clark, of Sunnyside, Wash., died suddenly, September 8, 1928. An attack of angina pectoris is reported to have been the cause of his death. He was believed to have been in good health up to the day before his final illness.

Born in Roslyn, Wash., thirty-nine years ago, Dr. Clark attended the State College of Washington and received the degree of D. V. S. in 1912. He was associated in practice with Dr. Robert Prior, in Yakima, in 1915 and 1916. He enlisted in the Army during the late war and served overseas, with the army of occupation, with rank of first lieutenant. Later he became interested in ranching in the Yakima Valley and the Sunnyside

district. In 1926 he entered the employ of the State, as deputy veterinarian.

Dr. Clark joined the A. V. M. A. in 1922. He was a member of the Washington State Veterinary Medical Association and the American Legion. He was a very conscientious worker and his death will be a marked loss to the veterinary profession. His widow, step-father and one cousin are the only surviving relatives.

R. P.

## ARTHUR HOBBS

Dr. Arthur Hobbs, at one time veterinary inspector in the Northwest Mounted Police Force, stationed at Calgary, and later attached to the Meat Inspection Division, Health of Animals Branch, Canada Department of Agriculture, at Winnipeg, died at Ponoka, Alta., September 15, 1928. Dr. Hobbs was a graduate of the Ontario Veterinary College, class of 1899.

## FRED E. PIERCE

Dr. Fred E. Pierce, of Los Angeles, Calif., died suddenly at his home, September 26, 1928. He was sixty-two years of age. Dr. Pierce was a graduate of the Chicago Veterinary College, class of 1889. He located in Oakland, Calif., about 1890, and practiced there until about 1900, when he removed to Los Angeles. Here he entered the firm of Pierce Brothers, pioneer Los Angeles undertakers. He was president of the firm when he died. He was president of the California State Board of Embalmers and past exalted ruler of the Los Angeles Elks' Lodge. Dr. Pierce is survived by five brothers and two sisters.

## H. S. WRIGHT

Dr. H. S. Wright, of Greensburg, Pa., aged 68, died suddenly, August 21, 1928. He was a registered non-graduate practitioner and had just returned home from a vacation in the East.

## JULIUS W. SCHEIBLER, SR.

Dr. J. W. Scheibler, Sr., of Memphis, Tenn., died at his son's home, in Memphis, October 5, 1928. The cause of death was a paralytic stroke, suffered two days previously and the second in two weeks. On August 22, he was in an automobile accident and was thrown violently against the steering-wheel of his

machine. It is believed that the two strokes were sequelae of the injuries received in the accident.

Born in Richmond, Indiana, February 22, 1864, Dr. Scheibler came to Memphis with his parents when he was two years old. He attended local schools and the University of Tennessee, at Knoxville. He received his veterinary education at the American Veterinary College, from which he was graduated in 1885. He remained at the institution for a year as resident surgeon and then returned to Memphis and established one of the largest veterinary practices in the South. He built and equipped the first veterinary hospital in Tennessee and served as city veterinarian continuously from 1892 until his death. For many years he was president of the Tennessee State Board of Veterinary Medical Examiners, resigning in 1921. He was state veterinarian during the administration of Governor Robert L. Taylor.

Dr. Scheibler joined the A. V. M. A. in 1885 and, at the time of his death, was one of two remaining members who joined that year, the other being Dr. W. G. Hollingworth, of Utica, N. Y. Dr. Scheibler was an active member of the Tennessee State Veterinary Medical Association and served one year as president. He also held membership in the Memphis Newspaper Men's Club, the First Methodist Church and several local civic organizations.

The high esteem in which Dr. Scheibler was held locally was reflected by the following editorial tribute by the Memphis *Press Scimitar:*

> Few men in Memphis had a larger acquaintance or more real friends than Dr. Julius W. Scheibler, Sr.
>
> He made friends for friendship's sake and not with an eye to what they could mean to him in a social or business way.
>
> He never was too busy for a hearty handclasp and a pleasant smile. He was the kind of man who ever had a kindly interest in his fellow man. He sympathized with them in their adversities and rejoiced in their successes, but their fortune or misfortune never made any difference in the relationship to him.
>
> His passing will be mourned by all who knew him as a true Southern gentleman.

Dr. Scheibler is survived by his widow and one son, a veterinarian, Dr. Julius W. Scheibler, Jr. The funeral services were under Masonic auspices.

## LINK GRIGSBY

Dr. Link Grigsby, of Walkerton, Indiana, died at North Liberty, Indiana, October 16, 1928, following injuries received in an automobile accident on the Liberty Highway, near the latter place. Dr. Grigsby was born in Hartford, Conn., August

4, 1879. He was graduated from the St. Joseph Veterinary College in 1918 and joined the A. V. M. A. the following year. He was in general practice.

### HOMER ALBERT McINTIRE

"To dance enjoyably to the rhythmic strains of an orchestra, to feel the exhilaration inspired by music, to walk happily from the dance floor, only to die at its entrance—that is an easy and enviable way to leave this world. And that is the way Dr. H. A. McIntire, of Maquoketa, died last evening in Cedar Rapids."

The above paragraph, taken from the Cedar Rapids (Iowa) *Evening Gazette*, describes the tragic end of one of Iowa's foremost veterinarians, October 17, 1928, while attending the annual meeting of the Eastern Iowa Veterinary Association.

Born in Indianapolis, a little more than fifty years ago, Dr. McIntire received his veterinary training at Iowa State College. He was graduated in 1902 and practiced at Maquoketa ever since. He had not enjoyed good health for more than a year.

Dr. McIntire joined the A. V. M. A. in 1917. He was a past president of the Eastern Iowa Veterinary Association and a member of the Executive Committee. He is survived by his widow, one daughter and three sons.

## PERSONALS

### MARRIAGES

Dr. Lee McDowell Esh (U. P. '28), of Philadelphia, Pa., to Miss Katheryne Aiken, of Yeagertown, Pa., August 10, 1928, at Media, Pa.

Dr. Warren P. S. Hall (Mich. '20), of Toledo, Ohio, to Miss Marguerita Ellen Ward, of Columbus, Ohio, October 13, 1928, at Columbus, Ohio.

### BIRTHS

To Dr. and Mrs. E. C. Jones, of Los Angeles, California, a daughter, September 23, 1928.

To Dr. and Mrs. L. H. Conlon, of Towanda, Pa., a daughter, Oct. 11, 1928.

### PERSONALS

Dr. R. V. Gibbons (Corn. '25) has entered general practice at Clyde, N. Y.

Dr. B. L. Strohl (Ind. '08) has been re-engaged as Edgar County (Ill.) Veterinarian.

Dr. Harry Wenborne (Ohio '94) has removed from Wauwatosa, Wis., to Allenton, Wis.

Dr. Ray O. Porter (K. C. V. C. '09) has removed from Holdrege, Neb., to Kearney, Neb.

Dr. J. A. DeSerpa (San. Fran. '10), has been appointed City Health Officer of Ventura, Calif.

Dr. L. N. Peterson (Chi. '10), formerly of Center, Colo., is now located at Canon City, Colo.

Dr. F. I. Reed (Corn. '26) has purchased the practice of Dr. H. W. Naylor (Corn. '13), at Morris, N. Y.

Dr. E. M. Aldrich (U. P. '13), of Watertown, Mass., has removed to Waverly, Mass. Address: 26 Harriet Ave.

Dr. George C. Moody (Ont. '85), of Mason, Mich., has been appointed Ingham County (Mich.) Veterinarian.

Dr. Walter Shaw (Ont. '81), of Dayton, Ohio, recently opened a new veterinary hospital at 533 West Third St.

Dr. H. W. Naylor (Corn. '13), of Morris, N. Y., is engaged in the manufacture of veterinary specialties at that place.

Dr. M. L. Boevers (Iowa '24) has requested a change of address from Lanett, Ala., to P. O. Box 2261, Auburn, Ala.

Dr. Carl J. Wallen (O. S. U. '23) gives us a change of address from Redlands, Calif., to 120 West Gilbert St., Glendale, Calif.

Dr. G. W. McNutt (Iowa '17), of Clear Lake, Iowa, has accepted a position at the State College of Washington, at Pullman.

Dr. Don McMahan (Ind. '02) is secretary of the North Dakota Federation of Cooperative Livestock Shippers, Fargo, N. D.

Dr. James W. Robertson (Chi. '12), formerly mayor of Georgetown, Ohio, has entered general practice at Portsmouth, Ohio.

Dr. G. W. Cliffe (Ohio '92), of Upper Sandusky, Ohio, has disposed of his practice to Dr. A. E. Bixler (Ohio '16), of Rawson, Ohio.

Dr. C. P. Brose (O. S. U. '27), of Belle Center, Ohio, has removed to Portsmouth, Ohio, and opened a veterinary hospital at that place.

Dr. F. R. Allerton (K. S. A. C. '25) is now in the employ of the California State Department of Agriculture and is stationed in Los Angeles.

Dr. F. A. Humphreys (Ont. '19), formerly located at Govan, Sask., has accepted a position at the Veterinary Research Station, Hull, Que.

Dr. Paul S. Dodd (Ind. '18), of Kansas, Ill., has accepted the position of Coles County (Ill.) Veterinarian and has removed to Charleston, Ill.

Dr. W. C. Bateman (Ind. '13) has been appointed San Bernardina County (Calif.) Veterinarian. This county is the largest in the United States.

Dr. Paul S. Dodd (Ind. '18), of Westfield, Ill., has been employed as Coles County (Ill.) Veterinarian for the period of one year, from October 1, 1928.

Dr. J. R. Taylor (Chi. '04) resigned his position with the Illinois State Department of Agriculture and has located for general practice at Sullivan, Ill.

Dr. G. W. Derrick (Corn. '17), who has been engaged in veterinary research work at Cornell University, has located at Elbridge, N. Y., for general practice.

Dr. D. N. Voetberg (Iowa '27), of Grundy Center, Iowa, recently purchased the practice, office and equipment of Dr. L. L. Diller (Chi. '02), at Traer, Iowa.

Dr. E. M. Alderman (K. C. V. C. '14), who has been at the Michigan State College, East Lansing, for the past year, is now located in Yazoo City, Miss.

Dr. A. G. Gierke (Corn. '17) has given up his practice at Clyde, N. Y., and has accepted a position as assistant in veterinary research at Cornell University.

Dr. J. F. Adee (K. S. A. C. '23), of Topeka, Kans., is employed by the Kansas State Board of Agriculture in the capacity of Deputy State Dairy Commissioner.

Dr. A. T. Thompson (O. S. U. '28), of Columbus, Ohio, has accepted a position in the Pennsylvania Bureau of Animal Industry Laboratory, Harrisburg, Pa.

Dr. Kenneth W. Keyes (Corn. '27), formerly of Concord, N. H., is now located at Whitehall, N. Y., in the employ of Borden's Farm Products Company, Inc.

Dr. V. H. Miller (O. S. U. '24), who was in practice during the summer at Marengo, Iowa, has located at Ottawa, Ohio, where he expects to remain permanently.

Dr. H. E. Marshall (Ind. '15), who has been engaged in tuberculin-testing with the Illinois State Department of Agriculture, has returned to private practice at Oblong, Ill.

Dr. A. Savage (Corn. '14) has resumed his duties as pathologist at the Manitoba Agricultural College, after an absence of a year, spent in postgraduate work in Edinburgh, Scotland.

Dr. Warren B. Rawlings (U. P. '28) formerly of Philadelphia, is now located at Swiftwater, Pa., where he is employed by the National Drug Company and also conducts a general practice.

Dr. J. W. Benner (K. S. A. C. '11), of the N. Y. State Veterinary College, Cornell University, is taking postgraduate work at the College of Veterinary Medicine, Ohio State University.

Dr. J. G. McKee (A. P. I. '26), formerly with the North Carolina Department of Agriculture, is now engaged in tuberculosis eradication work in South Carolina, with headquarters at Columbia.

Dr. D. R. Herberich (Chi. '20), formerly of Kempton, Ill., is now operating a dog and cat hospital at 1310 West 79th St., Chicago, Ill. Dr. Herberich opened his new hospital on September 22.

Dr. R. L. Hectorne (Ohio '28), of Avon, Ill., has accepted an appointment in the Department of Animal Pathology, at the University of Illinois, as an assistant to Dr. Robert Graham (Iowa '10).

Dr. I. R. Cooper (A. P. I. '16), who has been engaged in tuberculosis eradication work in North Carolina, has gone to Columbia, South Carolina, where he is now occupied in the same line of work.

Dr. John B. Hagenbuch, Jr. (U. P. '28), of Philadelphia, Pa., has accepted a position with the Walker-Gordon Laboratory Company, at Plainsboro, N. J., as a member of the veterinary staff of the Company.

Dr. Russell G. McNellis (Iowa '28), of Janesville, Minn., has accepted an appointment as Junior Veterinary Sanitarian in connection with the Federal Import Milk Act and is stationed at Rouses Point, N. Y.

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Dr. C. A. White (Chi. '94), of Los Angeles, Calif., accompanied by Mrs. White, returned home about the middle of October from a trip to England. While abroad Dr. White visited a brother who is a veterinarian.

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Dr. I. E. Newsom (K. S. V. C. '09-San Fran. '06), of Fort Collins, Colo., was elected grand master of the Grand Lodge, A. F. & A. M., of Colorado, at the sixty-eighth annual meeting of the order, held in Denver recently.

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Dr. W. J. Butler (N. Y.-Amer. '03), state veterinarian of Montana, addressed the Montana Public Health Association, at Canyon Hotel, Yellowstone Park, August 27, 1928, on the subject, "Progress Report on Tick Parasite Work."

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Dr. S. H. Keston (McK. '14), who has been located in Winnipeg, where he was attached to the Health of Animals Branch, Canada Department of Agriculture, has been transferred to Ottawa, for work in the Pathological Division.

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Dr. M. E. Gouge (K. C. V. C. '10), of Sedalia, Mo., was in charge of the ceremonies in connection with the laying of the cornerstone of the Elks' new home at Sedalia, October 14. Dr. Gouge is Exalted Ruler of the local body, which now numbers 350 members.

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Dr. F. E. McClelland (Corn. '09), of Buffalo, N. Y., accompanied by Mrs. McClelland, spent several weeks in Europe the past summer. While abroad they visited Scotland, England, Holland, Belgium and France. They were away from July 12 until August 16.

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Dr. C. M. Carpenter (Corn. '17) has resigned his position at the N. Y. State Veterinary College, at Cornell University, and has accepted a position at the Union Medical School, Albany, N. Y., where he will work toward a degree in medicine and will carry on bacteriological research work.

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Dr. Hubert Shull (Ont. '16), of Texarkana, Ark., was "lionized" by the Lions Club of his city at the recent "Governor's Day" luncheon. Dr. Shull was showered with tributes for his manhood, traits of character, genius, accomplishments, and many other things which contributed to make him such a valuable member of the organization.

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Dr. R. A. Whiting (Corn. '05), who has been a member of the veterinary staff of Purdue University for the past eighteen years has resigned his position and gone to San Diego, Calif., to accept the position of director of veterinary research for the San Diego Zoological Society and the San Diego Poultry Association. The San Diego zoo is one of the largest in the West.

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Dr. Roger S. Amadon (O. S. U. '16), of the University of Pennsylvania, came out victor in a tussle with an eight-foot shark while fishing in Delaware Bay during his vacation. The battle with the shark lasted for an hour and, for good measure, Dr. Amadon hooked into and landed three drum-fish that weighed thirty-five pounds each. Not so bad for a fresh-water angler!

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Dr. William M. Hickman (Cin. '18), of Covington, Ky., has been appointed veterinarian to have charge of the testing of dairy cattle in Kenton County, Ky. Dr. Hickman will be allowed a salary of $2,000 a year, of which Kenton County will pay sixty per cent and the City of Covington the balance. Dr. Hickman will work under the supervision of Dr. L. H. Crisler (Ohio V. C. '94), city food inspector.

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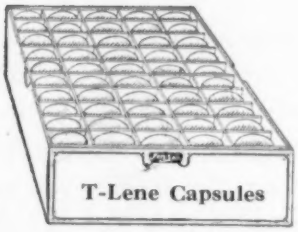


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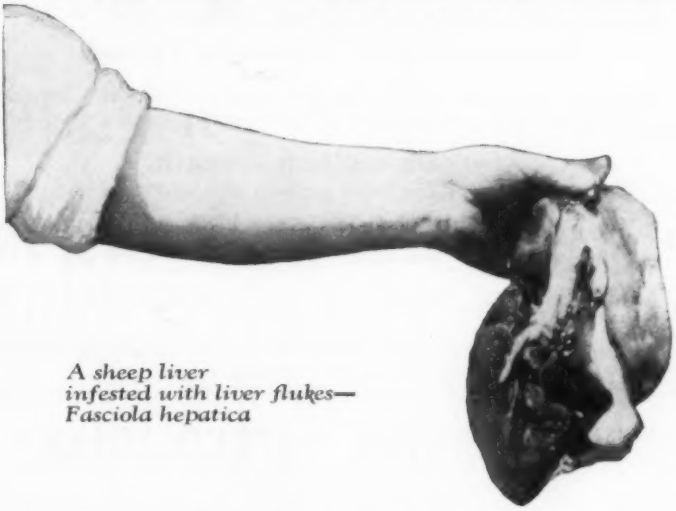

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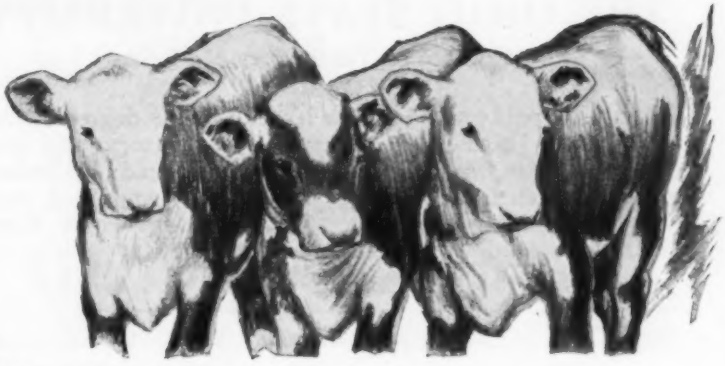

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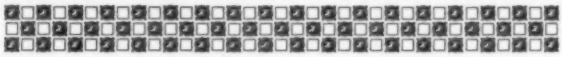

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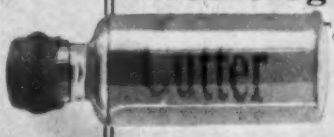


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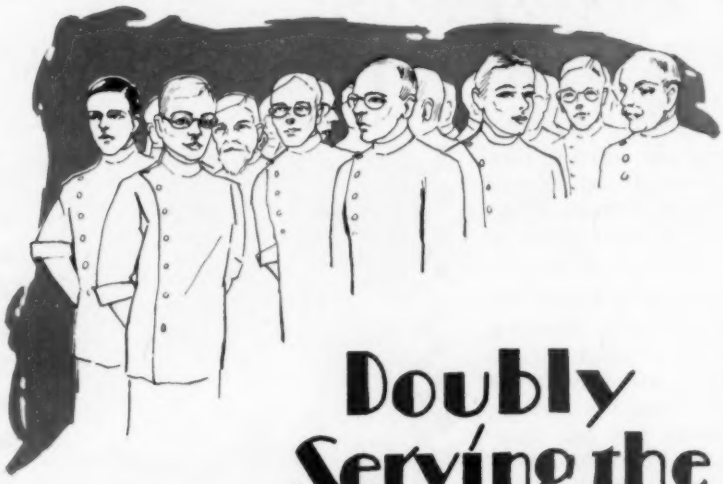

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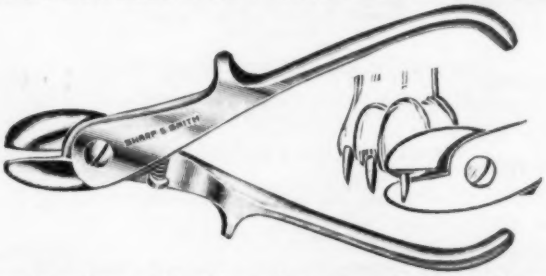


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